

# CASTANEA

## The Journal of the Southern Appalachian Botanical Club

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All persons interested in the botany of the Southern Appalachian Mountains are invited to join the club. Dues, including subscription to the Journal, are \$3.00 per year. Single copies of *Castanea*, seventy-five cents.

Notes and short scientific papers relating to the botany of the region are welcomed and will be published to the extent that the size of the Journal allows.

Authors will receive six gratuitous copies of the issue in which their papers appear. Separate reprints, if ordered in advance, will be furnished at cost.

# CASTANEA

## The Journal of the Southern Appalachian Botanical Club

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Notes on the Plant Geography of West Virginia\*

EARL L. CORE

### Location and Climate

West Virginia has one of the most irregular outlines of any State in the Union. Various "panhandles" and lobes extend its territory to distances relatively far removed from the main body of the State, which fact is significant in any consideration of the phytogeography, as carrying its territory into latitudes and longitudes remarkably distant from one another, in view of the comparatively small area (24,181 sq. mi.) of the entire State. It is variously regarded as one of the northern, southern, eastern or western states. Its northern "pan-handle" extends into the latitude of Staten Island; to the south it extends 60 miles below the latitude of Richmond; its eastern "pan-handle" extends 50 miles east of the longitude of Buffalo; and its westernmost tip is 40 miles farther west than Cleveland.

Even more noteworthy from the phytogeographical standpoint are the variations in altitude, ranging from 272 feet at Harper's Ferry to 4860 feet above sea-level on Spruce Knob. This range in altitude to a large degree overshadows the latitudinal range, so that the coldest temperatures are often reported from the central or southern counties. The accompanying table (Table I) gives the mean temperature and precipitation for the State as a whole since 1890, when the official recordations were begun.

Table I.

#### Mean Temperature and Precipitation for West Virginia 1890-1930

(From U. S. Weather Bureau, Climatological Data)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann.
Prec.	2.82	3.08	3.94	3.52	3.91	4.47	4.49	4.15	3.03	3.12	2.80	3.51	43.57
Temp.	32.1	32.2	42.6	51.6	62.0	70.1	73.1	71.8	65.8	54.7	42.5	33.3	52.7

The lowest official temperature recorded in the State since 1891 was  $-37^{\circ}$  at Lewisburg in Greenbrier County. The highest in the

\*Contribution No. 54 from the Herbarium of West Virginia University.

same period was 112° at Martinsburg in Berkeley County and Moorefield in Hardy County.

The average temperature in winter is 33.6°, spring 52.3°, summer 71.5° and fall 54.7°. The coldest part of the State is the Cheat River Basin (aver. ann. temp. 49.6°), while the warmest is the Tug Fork Basin (55.2°). The average length of the growing season for the State is 160 days. In the eastern panhandle it is 153 days; in the northern section 159 days; and in the southern 163 days. It ranges from 193 days at Logan to 119 at Bayard.

Rainfall is not so evenly distributed over the State as might be expected. It reaches its greatest amount in the high mountains of Randolph, Webster and Nicholas Counties in the central part of the State, where the most luxuriant forests occur, and its lowest point just east of the Alleghanies in Pendleton and Grant Counties. At Pickens, in Randolph County, the normal precipitation is 68.70 inches annually; at Upper Tract, in Pendleton County, hardly 50 miles to the northeast, it is only 25.14 inches. In the "great drought year" of 1930, while Pickens was receiving ample rainfall, 44 inches, the quantity received at Upper Tract was only 9 inches. In one month of that year (March), Pickens recorded 6 inches of rainfall, 2/3 of the amount Upper Tract received in the entire 12 months. Approximately 8% of the annual precipitation falls as snow, the percentage varying



Fig. 1. Spruce Knob, elevation 4860 ft., the highest point in West Virginia. Note effects of prevailing winds on dwarfed red spruce. Photo by W. E. Rumsey.



from 16 at Pickens to 4 at Williamson. The snowfall averages from less than 20 inches a year in the southwestern counties to 35 inches in the west-central counties, then increasing rapidly in the mountain areas (Preston, Tucker, Randolph, Pendleton and Grant Counties), where the average is over 70 inches. The greatest snowfall is at Pickens, with an average of 105 inches annually.

### **Botanical Exploration**

The flora of West Virginia has been studied by many of the best known botanists of the country. Among these may be mentioned Michaux, who travelled down the Ohio and down the Shenandoah, collecting along the shores now West Virginia territory; Pursh, who collected in Jefferson, Greenbrier, and Monroe Counties; Rafinesque, who collected along the Ohio, South Branch and Shenandoah; Barton, who explored the eastern counties; Asa Gray, who travelled through Tygart's Valley, Shaver's Fork, and the headwaters of the Greenbrier; Canby, who collected around Grafton; John Merle Coulter, who collected in the Kanawha Valley; and John Donnell Smith, who collected near Grafton and Mannington. The most exhaustive and systematic studies of the State's flora were made by C. F. Millspaugh and John L. Sheldon, among the earliest botanists of West Virginia University. Other prominent botanists who have made collections in West Virginia include John K. Small, N. L. Britton, K. K. Mackenzie, P. A. Rydberg, J. M. Greenman, A. S. Hitchcock, E. S. Steele, E. L. Green, Edgar T. Wherry, F. W. Pennell, H. A. Allard, and F. W. Hunnewell. Among amateurs should be noted L. W. Nuttall, a coal operator of Fayette County, who spent most of his spare time from 1890 to 1898 building up a large collection of plants of that county, largely fungi; and Fred W. Gray, a Presbyterian minister, who made an intensive study of the mountain flora, chiefly with respect to lichens, bryophytes and pteridophytes. Jos. E. Harned, of Oakland, Md., made many trips in West Virginia in gathering data for his book, "Wild Flowers of the Alleghanies". Dr. P. D. Strausbaugh and his students added the names of hundreds of species new to the State in the course of botanical expeditions that toured the State every summer from 1926 to 1941. This list of botanists could be indefinitely extended if it were made to include all those whose piecemeal contributions have resulted in the accumulation of the present body of our knowledge concerning the flora as a whole.

### **Plant Communities**

West Virginia was in its primitive condition almost entirely covered by forests, principally of deciduous trees, but also including

a valuable belt of evergreens along the high ridges of the Alleghenies. Classified according to the Life Zones of Merriam, the principal species belong to the Upper Austral, Alleghenian, and Canadian zones. The intricate physiographic pattern so greatly influenced the distribution of the trees that the mapping of the cover types is extremely difficult, although the State has two fairly natural subdivisions, the high Appalachian section in the east and the plateau to the west. In the higher elevations long narrow strips of the northern forest extended across the State in a north and south direction along the mountains. In the north and west the plateau is well cut by erosion into rounded hills, while in the south it consists of flat-topped hills and deep canyons. This area was originally covered by representatives of cover types of the central forest. The following discussion is based on the forest cover types of the eastern United States, as recognized by the Society of American Foresters. The cover types of each forest region are grouped according to their moisture relations, ranging in general from dry to wet. The writings of A. B. Brooks, formerly state forester, provide useful information concerning the distribution of certain tree species.

### The Northern Forest

*Pin Cherry*.—This type occurs at 3000 feet and above in the mountain counties, in pure stands or associated with aspen, bigtooth aspen, red maple, red oak, yellow birch, red spruce and mountain ash. Normally it appears only in small patches on well-drained soil, as a shorter-lived pioneer type. Paper birch, an associate farther north, is rare in West Virginia, being known only from Pendleton, Grant and Hardy Counties.

*White Pine*.—This species was found in extensive areas, in pure stands in Tucker, Pocahontas, Greenbrier, Mercer and Raleigh Counties, mostly on sandy, loam upland soils. Elsewhere it is frequently associated with tuliptree, chestnut, hemlock, red oak, white oak, chestnut oak, and scarlet oak. Red pine, an associate farther north, is known in West Virginia only from Pendleton and Hardy Counties. This cover type appears generally at elevations of from 1500 to 4000 feet, or even higher.

*White Pine-Hemlock*.—This combination was best developed in cool locations, in ravines and on north slopes. Generally its occurrence is in small bodies widely scattered. There are numerous associates but none particularly characteristic.

*Hemlock*.—This was originally an extensive type, especially in moist ravines and on north slopes, either in pure stands or associated



Fig. 2. Northern hardwoods in the Monongahela National Forest. Photo by U. S. Forest Service.

with beech, sugar maple, yellow birch, basswood, red maple, wild black cherry, white ash, white pine, sweet birch, red oak and white oak. Hemlock was most abundant in Randolph, Webster, Tucker, Pocahontas, Nicholas, Raleigh, Clay, Mercer, Greenbrier and Upshur Counties, at almost any elevation.

*Sugar Maple—Beech—Yellow Birch.*—This covers extensive areas on rich moist loamy soils, mostly in a zone from 3000 feet to over 4000 feet in elevation. The three dominants occur in different proportions with different areas, with admixtures of basswood, red maple, hemlock, red oak, white ash, white pine, wild black cherry, sweet birch, American elm, chestnut and cucumbertree. These trees are often referred to as *northern hardwoods*.

*Sugar Maple.*—Sugar maple in pure stands was found on deep rich moist soils, but generally in small areas. In places a pure stand has been created artificially through desire to develop a grove for sugar production. A small proportion of other species may be present, as yellow birch, sweet birch, white ash, red oak and white oak. It reached its best development on the elevated flats and in the rich coves of the Alleghenies from Tucker to Greenbrier and Monroe Counties.

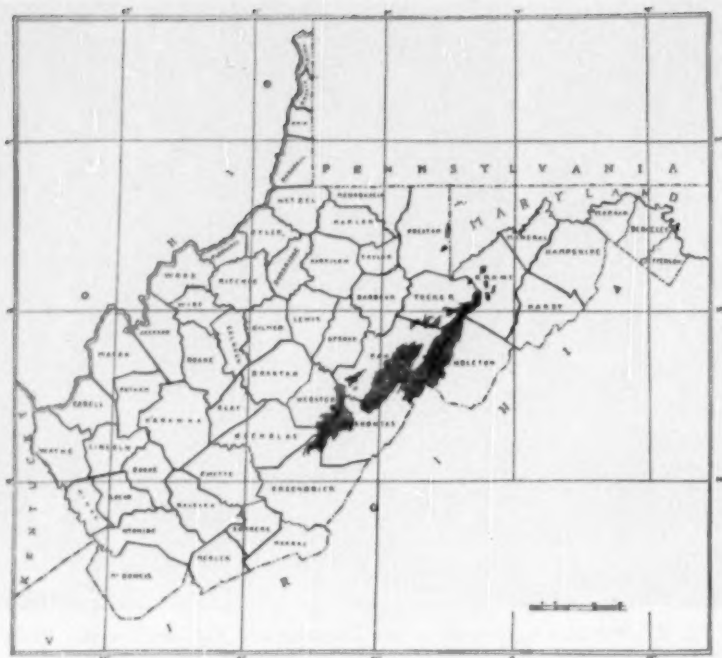


Fig. 3. Map showing original distribution of red spruce in West Virginia. Courtesy W. Va. Geological Survey.

**Yellow Birch.**—Yellow birch in pure stands was apparently a temporary type, although of long-life. It increased in abundance with the opening up of the forest. Associates are red maple, sugar maple, yellow buckeye, beech and hemlock. Its principal occurrence was at elevations of 3500 feet and up, along the Alleghenies from Grant and Tucker south to Mercer and McDowell Counties.

**Yellow Birch—Red Spruce.**—In the northern States, particularly in Maine, this was the most important commercial type and it was well represented in West Virginia at elevations of 3500 feet and above. In addition to the two dominants, there occur beech, sugar maple, mountainash, and balsam fir as associates in certain areas.

**Red Spruce.**—Pure stands of red spruce were found in many areas above 3200 feet, on moderately well drained flats and on well drained slopes. In some places fine stands of pure second-growth spruce are developing, as on Gaudineer Knob, Randolph County and Bald Knob, Pocahontas County. Occasional associates include balsam fir, yellow birch, sugar maple, beech, red maple, hemlock, white ash and mountainash. In West Virginia *spruce-hemlock* is a characteristic

variant within the red spruce type. Brooks estimates the original area of red spruce in the State at 469,000 acres. (Fig. 3). On the forest floor white wood sorrel is the most common flowering plant, growing in a thick carpet of mosses of such genera as *Hypnum* and *Hylacomium*.

*Red Spruce—Balsam Fir.*—At elevations of 3200 feet and above this was a climax cover-type, particularly in Canaan Valley, Tucker County, around the headwaters of Stony River, Grant County, in Blister Swamp, Pocahontas County, and along Blister Run, Randolph County. After removal it is replaced by yellow birch.

*Tamarack.*—A very small area of tamarack was found in Cranesville Swamp, Preston County, associated with red maple, black ash and trembling aspen. This is the southernmost known station of tamarack and includes only a few acres.



Fig. 4. Characteristic view in spruce forest, Webster County. Courtesy W. Va. Geological and Economic Survey.

### The Central Forest

*Post Oak.*—Dry flats, uplands and ridges, with heavy clay or loam soils underlaid by rock sometimes develop a pure stand of post oak, or this species associated with blackjack oak, black oak, white oak, scarlet oak, shingle oak, various hickories, shortleaf pine, scrub pine and black gum. This may be the climax forest in some of the driest sites. Post oak is not abundant in any locality, but is found in the intermountain valleys of the eastern panhandle and scattered throughout the counties of the western hilly portion of the State.

*Post Oak—Blackjack Oak.*—In some localities post oak and blackjack oak predominate, associated in widely varying quantities with shortleaf pine, black gum, black oak, scarlet oak, white oak, shingle oak, pignut hickory, mockernut hickory, sourwood, red maple, chinquapin and red cedar. Post oak predominates on heavy soils, blackjack on light soils. Blackjack oak occurs principally in the eastern and southern counties. Chinquapin is common in the southern counties of Mercer, Wyoming, Summers, Boone and Fayette, but is found in numerous other counties in the southern part of the State, and locally as far north as the South Branch Valley.

*Scarlet Oak—Black Oak.*—An important forest type, this is widespread over the mountains and foothills of the Allegheny and Appalachian ranges, usually below 3000 feet. It occupies dry ridges and south or west facing slopes and flats, probably a climax type. Scarlet oak is generally more abundant; small pure stands of both species are found. Associates are chestnut oak, white oak, hickories, pitch pine, black gum, chestnut, black locust, sourwood and dogwood.

*Scrub Oak.*—This species forms a prominent although temporary type on mountain slopes following heavy cutting and repeated fires. It is often in pure stand, nearly impenetrable, economically worthless except for game cover. Associates may be pitch pine, white pine, chinquapin, chestnut, scarlet oak, black oak, chestnut oak, red oak, black locust, red maple, sassafras and black gum. The distribution of scrub oak is principally on the dry eastern slopes of the Alleghenies.

*Chestnut Oak.*—This species occurs in pure stands or predominant on rocky outcrops with thin soil, apparently as a permanent type in some localities. On drier sites of the chestnut type it succeeded chestnut after that species died from blight. Common associates are chestnut, scarlet oak, white oak, black oak, post oak, pitch pine, black gum and red maple. Chestnut oak is most abundant in dry ridges of Pendleton, Grant, Hardy, Hampshire and Morgan Counties but is common in all parts of the State except at high elevations.

*Pitch Pine.*—Large areas in the Appalachians on dry ridges, flats, and slopes are occupied by pitch pine, often in pure stands. This type is frequent in old fields and is doubtless temporary. Chief associates are chestnut oak and scarlet oak. It is common on slopes of the intermountain counties of Grant, Hampshire, Hardy, Jefferson, Morgan, Pendleton, etc., but is found on dry hills in many other counties as Boone, Braxton, Clay, Doddridge, Fayette, Gilmer, Kanawha, Logan, Mercer, Monroe, Mingo, McDowell, Monongalia, Nicholas, Preston, Pocahontas, Randolph, Roane, Summers, Tyler, Wayne and Wyoming



*Shortleaf Pine-Scrub Pine.*—This type is of minor importance, since the area it occupies is small. It is commercially important only through the percentage of shortleaf pine it contains. It is spotty in distribution, occupying dry sites on southern slopes and in old fields. Associates include pitch pine, black oak, scarlet oak, white oak, post oak, black gum, blackjack oak, table mountain pine, chestnut oak and hickories. Shortleaf pine is sparsely distributed in West Virginia, being found principally east of the Allegheny Mountains and in hilly western counties such as Calhoun, Doddridge, Jackson, Putnam, Ritchie, Wetzel, Wirt and Wyoming.

*Scrub Pine.*—This type is widely distributed, especially to the east of the high crests of the Appalachians. It is a temporary type, often originating in old fields and being succeeded by shortleaf pine. Principal associates are shortleaf pine, chestnut oak, white oak, chestnut, red oak, black oak, red maple and black gum. In Hampshire county it is the prevailing softwood, as it is in many other places in the eastern panhandle, but it is also scattered throughout the western counties.

*Red Cedar.*—This type is frequent, especially in the eastern counties. It is typical of limestone outcrops in dry uplands, usually abandoned pastures or fields. Grazing favors this type and it may be the first to occupy old pastures. It is plentiful in the eastern panhandle counties, but exists in scattered growth throughout the whole western and southern hilly section. It is fairly abundant in Gilmer, Calhoun and Putnam Counties.

*Black Locust.*—Black locust pure or predominating was a cover type originally found on any well-drained soil, but found its most favorable conditions on dry sites, particularly on limestone outcrops. As a type it was widely distributed but local. The species has now spread widely from its original range into abandoned fields and along roadsides. It is frequent in every county. It is interesting to note that the native home of the shipmast locust is believed to be in Randolph County.

*White Pine-Chestnut Oak-Chestnut.*—This cover type occupies coves, mountain slopes and flat ridgetops, varying from moist deep loam to sandy or gravelly dry sites. In the coves and on northern exposures associates are yellow poplar, red oak, white oak, hemlock and hickories, while on dry sites the common associates are scarlet oak, red maple, pitch pine, shortleaf pine and black gum. This type is most common in the mountain counties from 1500 feet and above.



Fig. 5. Virgin white oak stand in the Monongahela National Forest. Photo by U. S. Forest Service.

*White Oak—Black Oak—Red Oak.*—This is a common type on loamy well-drained soils throughout the hilly section. Associates include American elm, red maple, black walnut, basswood, black locust, beech and black gum. In the southern counties chinquapin and red gum may be associated. It is found chiefly at elevations of from 500 to 2000 feet.

*White Oak.*—White oak pure or predominant occurs on well-drained loamy soils throughout the hilly counties, but it generally of limited area, this species being found mainly in association with other species. It is one of the most widely distributed timber trees of the State and it is estimated that it originally constituted 30% of all hardwood timber in West Virginia. It is found in every county and in almost every wooded locality except at the highest elevations, but makes its best development in the Kanawha Valley and southwards and along the Ohio River.

*Red Oak—Basswood—White Ash.*—On moist fertile soils from 3000 feet and upward on the western slopes of the Alleghenies this is a rather important cover type. Associates are yellow buckeye, yellow birch, chestnut, black birch, sugar maple and black cherry.

*Red Oak.*—Red oak pure or predominating occurs locally on northern exposures, chiefly on western slopes of the Alleghenies between 2000 and 3000 feet elevation. Associates are black oak, scarlet oak, chestnut oak, chestnut and tuliptree. Red oak is most frequent and of the largest size in the high hilly and mountainous counties, growing at higher elevations than our other oaks. It is relatively infrequent, of smaller size, and poorer in quality in the low Ohio valley counties.

*Tuliptree.*—Pure stands of tuliptree or yellow poplar were common on western slopes of the mountains and throughout the hilly counties at altitudes of 500 feet to 4000 feet. These were usually found on moist lower slopes, northern exposures or moist coves and flats. It is now common as a second-growth and temporary type on abandoned fields. Originally it was of great importance because of its commercial value and ready accessibility, on the lower slopes. Occasional associates are red maple, black locust, black birch, red oak and cucumbertree. Tuliptree was most abundant and largest on the waters of the Kanawha River and southwards and was least abundant in the Potomac Valley.

*Tuliptree—Hemlock.*—Occasional strips at bottoms of slopes or along streams on the western slopes of the mountains were covered with tuliptree and hemlock as the dominant species.

*Tuliptree—White Oak—Red Oak.*—On the western slopes of the mountains these species occasionally form the cover type on northerly exposures, coves and moist sites. Other moist site species, as sugar maple, may be important associates. The various associations in which tuliptree is an important component are often grouped together as *cove hardwoods*.

*Chestnut.*—This was originally one of the most important cover types in West Virginia, occupying moist northerly slopes and coves and extending to southerly exposures. It formerly occurred in large stands but has now been eliminated by the blight from the list of timber trees. Struggling stump sprouts or seedlings continue to produce a few fruits, but there is little evidence of any pronounced recovery. Chestnut oak and red oak in many places have replaced the dead chestnuts. It was most abundant and of largest size in the high hilly and mountainous counties of Preston, Barbour, Upshur, Randolph, Braxton, Webster, Pocahontas and Nicholas.

*Beech.*—Occasional pure stands of beech occur along stream courses of the mountain and hilly region, especially on heavy soils. The type was also created and extended by cutting of the trees

formerly regarded as more valuable commercially. It was found to some extent in almost every county, but was originally most plentiful in the valley of the Kanawha River and least abundant in the counties of the eastern panhandle.

*River Birch-Sycamore.*—This type is of vast extent in moist soil at the edges of creeks and rivers throughout the western half of the State. Although the strips are quite narrow, the lineal distance covered must run into thousands of miles. Both trees are very distinctive and easily recognized but of minor commercial value. Red maple, black willow and other moist site hardwoods are associated. River birch has been found along the following rivers: Williams, Gauley, Greenbrier, New, Kanawha, Little Coal, Elk, Guyandot, Big Sandy, Little Kanawha, Monongahela and Potomac. Sycamore occurs in every county.

*Silver Maple-American Elm.*—Throughout the western counties these species form a cover type common on silty soil of river bottoms and flood plains, especially along the larger rivers, as the Ohio. Many moist site hardwoods appear as associates, including red maple, cottonwood and green ash. Silver maple has been found along the following rivers: South Branch, Potomac, New, Kanawha, Elk, Little Coal, Tug Fork, Little Kanawha, Monongahela and Ohio. American elm is common in most parts of the State, although rare in the highland counties.

*Cottonwood.*—This species occurs in sandy, gravelly or silty soil along streams, although much less commonly than farther west. Chief associates in the younger stages are sandbar willow, and peachleaf willow, while invaders of the next successional stages are sycamore, river birch, white or green ash, American or slippery elm, silver maple, red maple, and, in the southern counties, red gum. It is widely distributed but infrequent in this State, being found in Hampshire, Grant, Mineral, Hardy, Greenbrier, Raleigh, Nicholas, Wayne, Wood and Tyler Counties. Red gum occurs along streams in the southern counties, particularly Clay, Fayette, Kanawha, Mingo and Nicholas.

#### Shrubby Associates

Many shrubby plants are found associated with the tree species discussed above. In the northern forest or at its margins occur yew, hoary alder, skunk currant, smooth serviceberry, wild holly, dwarf cornel, Allegheny menziesia, velvet-leaf blueberry, high-bush cranberry, hobblebush and many others. At somewhat lower elevations abundant shrubs are hazelnut, spicebush, hydrangea, ninebark, spiraea, various sumacs, deciduous hollies, strawberry bush, bladdernut, New

Jersey tea, St. John's wort, kinnikinnik, rhododendron, various azaleas, mountain laurel, huckleberry, many blueberries, buttonbush, dock-mackie, black haw, elder and many others. Dutchman's pipe, various grapes, and climbing bittersweet are common lianas in forests.

Small trees and shrubs with very decorative flowers include serviceberry, redbud, dogwood, rhododendron, pink azalea, flame azalea, fringetree and silverbell tree.

### Treeless Areas

Despite the fact that most of West Virginia was originally forested, there were still thousands of acres treeless at the time of the first exploration by the Europeans. Some of these areas, such as Old Fields, in Hardy County, had been cleared and cultivated by the aborigines, although such areas were small and would have been temporary in nature. Much larger areas, known as *glades*, were naturally treeless and the condition was of indefinite duration. These glades, common in Preston, Tucker and other mountain counties, were poorly drained mountain valleys where the vegetation could be classified as a sedge-



Fig. 6. Cranberry Glades, Pocahontas County. Courtesy of W. Va. Geological and Economic Survey.

meadow, covered with tall grasses such as bluejoint, reed canary grass and manna grasses, intermixed with many wild flowers, such as orchids, marsh marigold, swamp saxifrage, grass of Parnassus, burnet and gentians. The borders of such areas are fringed with alders, shrubby St. John's wort, hollies, chokeberries and spiraea.

Certain other areas were characterized not by a covering of tall grass, but by a mat of sphagnum, in which both the large and small cranberry may be found. These areas may be designated ecologically as *cranberry glades*. The most famous of these is Cranberry Glades, a 600-acre tract in Pocahontas County, but innumerable smaller cranberry glades occur in many places throughout the mountain counties. They are covered with peat, varying in thickness from a few inches to 10 feet or more. Acidity is quite high. Low seed plants such as sundew, buckbean, bog rosemary and numerous sedges occur with the cranberries.

Numerous flat-topped mountain ranges, 4000 feet and above in altitude, now have a covering of heath scrub and are locally called *huckleberry plains*. Numerous species of huckleberries and blueberries occur here and are of some economic value to mountain folk. Thousands of acres of uninhabited, rolling treeless barrens are swept by winds often of terrific force, explaining the name Roaring Plains, applied to the largest such area, in Randolph County. There is historical proof, however, that these areas were once forested and the treeless condition is hence temporary. On such exposed rocky summits may be found skunk currant, pearly everlasting, prickly sarsaparilla, three-toothed cinquefoil and other plants more common farther north.

### Shale Barrens

A unique type of plant habitat known as *shale barren* occurs locally on certain hard shale rocks of Devonian age, in West Virginia particularly in the South Branch valley of the eastern panhandle, and in Greenbrier and Monroe Counties, in the southeastern part of the State. In some places these are almost devoid of vegetation, the steep hillsides being covered with fragments of rock slowly sliding down the slope. In places where the substratum is better established, a sparse growth of scrub pine, pitch pine, scrub oak, dwarf hackberry, mountain laurel and other woody plants form an open forest, which grades into normal woodland where conditions permit. The unusually rigorous conditions lead to these areas being occupied by a number of endemic species, several of which have their type localities within this State. Among these are the following (type localities in parentheses): shale onion (Lillydale, Monroe County), yellow buckwheat (White Sulphur Springs, Greenbrier County), white-haired clematis (Kate's Mountain, Greenbrier County) mountain clover (Kate's Mountain), shale evening primrose (White Sulphur Springs), mountain pimpernel (Kate's Mountain), velvet bindweed (Sweet Springs, Monroe County), and shale ragwort (White Sulphur Springs). Other



species on the shale barrens include the mountain nailwort, wild pink, rocktwist, purple stonecrop, bent milkvetch, birdsfoot violet, moss-phlox, mountain beardtongue, spiked gayfeathers, early goldenrod, shale aster and Virginia pussytoes. These species frequently extend into old fields where pine forests were removed and the resulting exposure more or less completely removed the remaining vegetational cover. Pricklypear cactus becomes a very common and obnoxious weed in these fields.

#### Plants of Cliffs and Rocky Places

Rock outcrops are less common in the Appalachians than in more youthful mountain systems, but are by no means rare. They are habitats for many lichens, various mosses, and a few ferns, such as cliff brake, wall rue, walking fern and bladder fern. Noteworthy seed plants on rock cliffs include fameflower, columbine, rock cress, rocktwist and stonecrop. On the white medina sandstone making up Seneca Rocks and similar cliffs the curious silvery nailwort is found.



Fig. 7. Seneca Rocks, Pendleton County. The cliffs rise almost 1000 feet above North Fork River at the base. The lower slopes are sparsely covered with pines, oaks and other trees. *Photo by Paul H. Price.*

#### Aquatic Vegetation

Most of the streams of West Virginia are gradually cutting their channels deeper, resulting in changes from season to season which

make the establishment of submerged seed plants difficult. Pondweeds, coontail, milfoil, water celery, elodea, and other submerged plants occur but not as abundantly as in lakes and ponds. There are no natural lakes in West Virginia, although power and flood control dams have artificially impounded large bodies of water, as the Cheat, Tygart's and Bluestone projects. Canalization of certain streams, such as the Ohio and Monongahela Rivers, results in slowing the current and is an approach toward pond conditions. Cowlily and arrowhead, with floating or emergent leaves, are found in slow-moving streams. At the edge of such streams a rich muck of alluvial material accumulates and here may be found cattail, burreed, scouring rush, spikerush, bulrush, water plantain and many sedges and grasses. One of the most distinctive plants in sluggish creeks is the waterwillow, growing in wet soil at the margins and in shallow water out to the very middle of the streams. Farther back are rice cutgrass, deertongue grass, cardinal flower, peppermint, spearmint, water horehound, false nettle, water hemlock, dragonhead, turtlehead, monkeyflower, swamp beggarticks, various sunflowers and fireweed.



Fig. 8. Innumerable wild flowers appear in deciduous woods in early spring. Photo by Fred E. Brooks, courtesy of David R. Creel.

### Spring Flowers

In early spring, before the leaves have appeared on deciduous trees, the forest floor is a beautiful garden of herbaceous wild flowers. Noteworthy among these are jack-in-the-pulpit, yellow fawn lily, white fawn lily, large-flowered bellwort, Canada mayflower, white clintonia, plumelily, Indian cucumber-root, Solomon's seal, wake robin, painted trillium, large-flowered trillium, sessile trillium, crested iris, moccasin flower, yellow lady's slipper, wild ginger, goldenseal, dwarf larkspur, wood anemone, columbine, rue anemone, hepatica, hispid buttercup, blue cohosh, twinleaf, mayapple, bloodroot, pale corydalis, Dutchman's breeches, squirrel corn, toothwort, stoncrop, bishop's cap, foamflower, blue violet, sweet white violet, early yellow violet, downy yellow violet, smooth yellow violet, Canada violet, green violet, harbinger-of-spring, sweet cicely, trailing arbutus, starflower, wild phlox, bluebells, blue-eyed Mary, cancerroot, and golden ragwort.

### Summer Flowers

The wave of blooming in summer shifts to the open fields. This is the season for Turk's cap lily, Canada lily, blue-eyed grass, pokeweed, Bouncing Bet, agrimony, pasture rose, wild senna, sweet clover, red clover, St. John's wort, evening primrose, wild parsnip, wild carrot, stick-tights and the like. Roadsides, fencerows and pastures are the favorite haunts for this type of vegetation.

### Autumn Flowers

August brings the procession of composites, many of which persist until long after the first frosts. Among the more common autumn flowers are wild lettuce, hawkweed, ragweed, ironweed, Joe Pye weed, mist flower, many asters and goldenrods, coltstail, oldfield balsam, black-eyed Susan, beggarticks and numerous thistles.

A spectacular feature of the autumn vegetation is the brilliant coloration that precedes the shedding of leaves of the principal hardwood trees.

### Secondary Succession

Old fields no longer used for agricultural purposes are being reoccupied by vegetation in a great diversity of patterns, as would be expected from the complexity of the original forest cover. Many dry old fields develop a very complete cover of broomsedge, to be followed by greenbrier, dewberry, false indigo, blueberry and other species. Cinquefoil, bracken fern, panic grasses, black-eyed Susan, yarrow, thistles and hawkweed are very common in some localities.

Sassafras becomes abundant, while gradually oaks and pines come to dominate the area.

On moister, richer land appear weeds such as ironweed, oxeye daisy, wild carrot, etc., followed by shrubs, as papaw, sumac, black locust and great thickets of blackberry. More than 50 species of blackberry have been found in West Virginia. Many of these species have doubtless arisen since removal of the forests gave the genus opportunity to mutate. Hawthorns become abundant and these, too, are most diversified. Seedlings of tuliptrees, maples or beeches may then become established and a forest eventually develops.

### Plant Migrations

Since West Virginia has been constantly above water since the close of the Permian or earlier, the present flora is the result of plant migrations that have been going on for an enormously long period of time. The Pennsylvanian and Permian floras were extraordinarily rich in species of Pteridophytes, Pteridosperms and Cordaites, whose fossil remains form our vast coal beds. At the close of the Permian the elevation of the Appalachian Mountains produced conditions extremely unfavorable to the ancient marsh-loving plants and resulted in the extinction of innumerable types.

During the long ages of Triassic and Jurassic times the region was again base-leveled. The Coastal Plain, as known today, was entirely submerged. Into the peneplained region came the advance hosts of the newly evolved angiosperms, representatives of prevaillingly tropical groups (the "Gondwana Flora"), ranging far to the north as a response to the mild climate of the time. Then, at the close of the Mesozoic, the Appalachian region was again uplifted, resulting in its conversion from a low plain to a mesophytic area. The old tropical and sub-tropical species were thus forced to abandon their former haunts and to move out to the rising Coastal Plain, where suitable environments were still provided. But in favorable habitats on the now uplifted peneplain, some Cretaceous species were able to survive in relict colonies. In a list of such species, common on the Coastal Plain, and with a restricted distribution in the Appalachian region, there may be mentioned low Kyllinga, yellow-eyed grass, bunchflower, Oceanorus, false aloe, American mistletoe, butterflypea, pencillflower, passionflower, woolly Hudsonia, Meadow-beauty, Bartonia and Wood Tickseed. Other eastern species, as fringetree, silver-bell tree, and Canby's mountain-lover, may have entered the State through river valleys that dissect the mountain ranges, as the Potomac valley and the New-Kanawha valley (the ancient Teays valley).

Into the new Appalachian upland the abundant mesophytic flora of northern Europe, Asia and North America (the "arctotertiary flora") was able to migrate. The great majority of our present species may be regarded as the more or less modified descendants of this invading mesophytic flora of early Cenozoic times, now segregated into the various cover types so well adapted to the innumerable variations in habitat provided by the physiographic diversity. Many of the genera, then widespread throughout the northern hemisphere, have since been reduced to remnants widely separated geographically. Plants of this region now having congeners only in such remote lands as China or Japan include skunk cabbage, blazing star, colicroot, lizard's tail, mayapple, blue cohosh, magnolia, witch hazel and lopseed.

The Pleistocene glaciation did not reach West Virginia, the terminal moraine being 25 miles or more from the northernmost boundary, yet it is probable that at that time the northern part of the State must have presented the aspect of an Arctic tundra, while many Canadian species were forced hundreds of miles farther south. Upon the retreat of the ice sheet, and the consequent northward migration of biota, some of these species persisted in cold mountain areas throughout the Appalachians. Relict colonies of tundra, persisting as cranberry glades, are still in process of being replaced by migrating forests.

Finally, there should be mentioned as conspicuous members of our flora, hundreds of species reaching the State through the agency of man and establishing themselves as weeds in competition with our native species.

WEST VIRGINIA UNIVERSITY  
MORGANTOWN

## The Caprifoliaceae of West Virginia\*

VIRGINIA ARMSTRONG PIXLER

### Acknowledgement

The writer wishes to acknowledge her indebtedness to Dr. Earl L. Core, under whose direction this paper was written, for his helpful suggestions in research and in the preparation of this treatise. Acknowledgment is made also to Elizabeth Ann Bartholomew, Herbarium Assistant, for her able assistance. She wishes to thank the Curator of the Herbarium of the New York Botanical Garden for the loan of specimens.

### Introduction

This paper is an attempt to classify the genera of Caprifoliaceae occurring within the State. The study is based on the specimens in the Herbarium of West Virginia University. Use has been made also of some specimens from the Herbarium of the New York Botanical Garden.

Gray's *New Manual of Botany*, seventh edition, Britton and Brown's *Flora of the Northern United States and Canada*, Core and Ammons' *Woody Plants in Winter Condition* were freely used in making determinations and keys. The nomenclature follows Gray's Manual except where otherwise indicated.

The author has examined 345 herbarium specimens of this family including 325 from the Herbarium of West Virginia University and 20 from the Herbarium of the New York Botanical Garden.

The late Dr. C. F. Millspaugh made three checklists of West Virginia plants. His 1892 checklist included 6 genera, 13 species and one form of this family. His 1896 checklist included the same 6 genera, 13 species and one form and his 1913 list included 7 genera, 18 species and one form. In Dr. Earl L. Core's catalogue, 7 genera, 23 species and 1 form were listed.

One species, *Lonicera Morrowii* Gray, an introduced species which has escaped from cultivation, is being added to the list. Two species previously reported, *Viburnum nudum* L. and *Lonicera tatarica* L. are being excluded. There are no specimens of *Viburnum nudum* from West Virginia in the herbarium. From its distribution, it seems unlikely that it occurs in the State as it extends down the coastal plain and up in the Mississippi Valley. *Lonicera tatarica* is being excluded because it is not definitely known to be established.

\*Contribution No. 53 from the Herbarium of West Virginia University.



All specimens cited are from the West Virginia University Herbarium. One specimen of each species from each county was cited. The author usually cited the first one collected in each county. The county, specific location, collector and date of collection were tabulated for each specimen.

It is felt that the distribution may not be truly represented as some counties in the State have not been truly botanized. Collecting has been done mainly in those counties accessible to such ardent collectors as Dr. E. L. Core, Dr. P. D. Strausbaugh, Elizabeth A. Bartholomew, Mr. and Mrs. H. A. Davis, Wilbert Frye, Oscar Haight, John Paul Tosh and others.

This family has an economic importance because many of the plants, particularly *Viburnum*, *Lonicera* and *Symphoricarpos*, are used for ornamental planting. Some of the shrubs and vines provide shelter and food for the smaller wildlife of the State.

#### Key to Genera of Caprifoliaceae in West Virginia

1. Herbs
  2. Creeping; stamens 4, long-peduncled twin flowers.....1. *Linnaea*
  2. Erect, stamens 5, flowers sessile.....2. *Triosteum*
1. Shrubs
  2. Inflorescence cymose
    3. Leaves compound.....3. *Sambucus*
    3. Leaves not compound
      4. Fruit a drupe.....4. *Viburnum*
      4. Fruit a capsule.....5. *Diervilla*
  2. Inflorescence not cymose
    3. Corolla short, campanulate; fruit a two-seeded berry.....6. *Symphoricarpos*
    3. Corolla tubular or funnel-shaped; fruit a 3 or more seeded berry.....7. *Lonicera*

#### Vegetative Key to Genera of Caprifoliaceae in West Virginia

1. Herbs
  2. Creeping; evergreen.....1. *Linnaea*
  2. Erect; not evergreen.....2. *Triosteum*
1. Shrubs or vines
  2. Climbing or trailing vines.....7. *Lonicera*
  2. Upright shrubs
    3. Leaves compound.....3. *Sambucus*
    3. Leaves not compound
      4. Leaves 3-lobed or 3-ribbed.....4. *Viburnum*
      4. Leaves not 3-lobed or 3-ribbed
        5. Leaves entire
          6. Leaves connate-perfoliate.....7. *Lonicera*
          6. Leaves not connate-perfoliate
            7. Bundle trace 1, indistinct.....6. *Symphoricarpos*
            7. Bundle traces 3, distinct
              8. Leaves pubescent underneath.....7. *Lonicera*
              8. Leaves glabrous
                9. Leaves ciliate.....7. *Lonicera*
                9. Leaves not ciliate.....4. *Viburnum*
      5. Leaves not entire
        6. Leaf scars crescent-shaped or broad; leaves not ciliate.....4. *Viburnum*

6. Leaf scars triangular; leaves  
sometimes ciliate.....5. *Diervilla*

## 1. LINNAEA

1. *LINNAEA AMERICANA* Forbes, Hort. Woburn. 135. 1825. American Twin-flower. Moist mossy woods and cold bogs; Labrador to New Jersey and the mountains of West Virginia and Maryland, west to Minnesota; also far northward and westward. This is a creeping evergreen plant with obovate or rotund leaves, slightly crenate or entire. The slender peduncles fork into two pedicels at the top with one flower on each. There are only four stamens, 2 high on the corolla and 2 lower. The European species was said to be the favorite of Linnaeus, for whom it was named.

West Virginia includes the southernmost known localities of this plant in the Appalachians. Since it is a northern plant, one would expect to find it in the high altitudes as is the case in Randolph County. However, the altitude at Ice Mountain is only about 700 ft. Ice Mountain is a high curved ridge with a steep, concave slope which faces northwest and slopes to North River. The slope is covered with rocks and boulders. Water collects among the rocks, freezes during the winter and, being sheltered from the sunlight by the mountainside, the ice remains throughout the summer. Thus the temperatures are relatively low even in the summer. *Linnaea americana* was probably established in the State during the Ice Age. When the glacier receded, the twinflower failed to compete successfully with the advancing southern species and died out everywhere except in the high altitudes in Randolph County and at Ice Mountain. June-July. HAMPSHIRE: Ice Mountain, *W. F. Botanical Expedition*, June 28, 1927. RANDOLPH: Sinks of Gandy, *Core*, August 12, 1931.

## 2. TRIOSTEUM

1. Leaves connate-perfoliate.....1. *T. perfoliatum*  
1. Leaves not connate-perfoliate  
2. Leaves oval-ovate, narrowed at base; flowers red.....2. *T. aurantiacum*  
2. Leaves lanceolate or oval lanceolate, tapered to  
base; flowers yellow.....3. *T. angustifolium*

1. *TRIOSTEUM PERFOLIATUM* L. Sp. Pl. 176. 1753. Fever-wort, Horse-Gentian. Rich low woods; southern Massachusetts to Nebraska, Missouri and Alabama. This is a coarse, hairy perennial. The red corolla is almost equal with the long calyx lobes which remain attached to the orange-yellow, subglobose fruit. May-July. BERKELEY: North Mountain, near Martinsburg, *Shreve*, May 16, 1937; HAMPSHIRE: Hanging Rock, *Frye*, July 15, 1932; HARDY: Powder Springs near Moorefield, *Wilson*, Sept. 13, 1941.

2. *TRIOSTEUM AURANTIACUM* Bicknell, *Torrey* 1:26. 1901. (See *Rhodora* 25:202. 1923.) (*T. perfoliatum* var. *aurantiacum* (Bickn.) Wieg.) Scarlet-fruited Horse-Gentian. Open rocky or sandy woods; New Brunswick to Ontario, Iowa and North Carolina. This seems to be the most common species of *Triosteum* found in the State. The corolla is often much shorter than the calyx lobes. The orange-red fruit is ovoid. May-June. CALHOUN: no location, *Harris*, May 21, 1933; FAYETTE: Nuttallburg, *Nuttall*, 1890-1898; MONONGALIA: *Nolan*, 1909; OHIO: Girl Scout's Camp, Middle Wheeling Creek, *Bartholomew*, July 22, 1934; SUMMERS: near Hinton, *Boone*, Aug. 27, 1933; WAYNE: Cabwaylingo, *Phymale*, May 8, 1938; WEBSTER: Buffalo Bull Mountain, *Millsbaugh*, July 14, 1890; WETZEL: Fish Creek, near Littleton, *Core*, June 2, 1931.

3. *TRIOSTEUM ANGUSTIFOLIUM* L. Sp. Pl. 176. 1735. Yellow or Narrow-leaved Horse-Gentian. Shady grounds; Connecticut to Delaware and Alabama, west to Missouri. The corolla is yellow and there are long silky hairs on the stem. May. LINCOLN: Rocky woods near Guyan V. High School, *Gilbert and Williams*, April 30, 1938; HAMPSHIRE: Hanging Rock, *Frye*, Aug. 21, 1932; WAYNE: Lion's Hollow, *Lycan*, no date.

### 3. SAMBUCUS

- |                                   |   |
|-----------------------------------|---|
| 1. White pith; black berries..... | 1. <i>S. canadensis</i>                 |
| 1. Brown pith; berries not black  |   |
| 2. Red berries.....               | 2. <i>S. pubens</i>                     |
| 2. White berries.....             | <i>S. pubens</i> var. <i>leucocarpa</i> |

1. *SAMBUCUS CANADENSIS* L. Sp. Pl. 269. 1753. American Elder. In moist soil, New Brunswick and Nova Scotia to Florida, Manitoba, Kansas and Texas. This is a smooth stemmed shrub with the small white flowers in broad flat cymes. The purple-black berries ripen in August. There is much variation in the leaflets. Var. *acutiloba* Ellw. and Barry, with lacinate leaves has been found in Ohio County. The plant is common throughout the State. The fruit is of value as food for the birds. It also has some value as use for pies, jelly and jam. June. BARBOUR: Nestorville, *Core*, July 15, 1937; BROOKE: Schubert's Park, *Schubert*, June 4, 1942; CALHOUN: Grantsville, *Harris*, June 18, 1933; CLAY: 2 miles southwest of Prociuous, *Core*, July, 1937; DODDRIDGE: along Route 55, 1 mile south of Sedalia, *Core*, June 8, 1937; FAYETTE: Nuttallburg, *Nuttall*, June 12, 1892; GREENBRIER: near Alderson, *Fox*, Aug. 31, 1940; HAMPSHIRE: Hanging Rock, *Frye*, June 15, 1932; HARRISON: Shinnston, *Martin*, July 25, 1933; JACKSON: 2 miles west of Garfield, *Bartholomew*, Sept. 5, 1946; KANAWHA: Upper Falls, *Greenlee*, June 6, 1939; MARSHALL: along bank of Fish Creek at mouth of Lower Bowman Run, *Bartholomew*, June 15, 1940; MASON: Ten

Mile Creek, Route 35, *Core*, July 19, 1937; MERCER: Pinnacle Rocks, *Fox*, Sept. 1940; MINERAL: Keyser, *Taylor*, Aug. 19, 1933; MONONGALIA: Roadside, Morgantown, *Millsbaugh*, June 16, 1890; MONROE: near Wayside, *Fox*, Aug. 1, 1940; MORGAN: shore along Cacapon River, 2 miles north of Largent, *Core*, June 9, 1937; NICHOLAS: near Nettie, *Fox*, Aug. 9, 1940; OHIO: In open field at Wheeling Girl Scout Camp, Middle Wheeling Creek, *Bartholomew*, Aug. 4, 1934; PENDLETON: on Route 5, 2 miles west of Onego, *Core*, July 16, 1937; POCAHONTAS: Swamp in Droop Mountain State Park, *Wilson*, June 15, 1942; PRESTON: Reedsville, *Mr. and Mrs. Davis*, Aug. 14, 1942; RITCHIE: along Route 74, 7 miles north of Pennsboro, *Core*, July 8, 1937; SUMMERS: near Hinton, *Boone*, June 25, 1932; TAYLOR: along Tygart's River 2 miles north of Grafton, *Core*, July 7, 1937; TYLER: along Route 2, about 4 miles below New Martinsville, *Bartholomew*, June 18, 1944; WAYNE: near creek  $1\frac{1}{2}$  miles north of Fort Gay, *Lycan*, Sept. 25, 1931; WEBSTER: near Camp Caesar, *Fox*, Aug. 10, 1940; WETZEL: Wolf Run, north of Littleton, *Haught*, June 20, 1931; WIRT: near Owensport, *Bartholomew*, June 23, 1932.

2. *SAMBUCUS PUBENS* Michx. Fl. Bor. Am. 1:181. 1803. (*S. racemosa* of Amer. authors, not L.) (*Rhodora* 35:310. 1933.) Red-berried Elder. In rocky places, New Brunswick to Alaska, British Columbia, Georgia, Colorado and California. This shrub is similar to the preceding species, but with fine hairy twigs and leaves. The white flowers are borne on a racemose cyme. The red berries (white in var. *leucocarpa* Bernh.) ripen in June, which is about the time *S. canadensis* is in bloom. These berries are bitter and unpleasant but the birds seem to like them. In the mountain regions where this plant is found they may be an important food for birds in early summer. May. FAYETTE: Nuttallburg, south side of river, *Nuttall*, April 28, 1892; GRANT: Cosner Gap, *W. V. U. Botanical Expedition*, July 6, 1927; HAMPSHIRE: 4 miles southeast of Junction on Taylor Farm, *Frye*, Aug. 18, 1942; MERCER: Brush Creek Falls, *McNeill*, July 16, 1941; MONONGALIA: Quaffy Run, *Goff*, May 16, 1924; NICHOLAS: Panther Creek, *Fox*, Aug. 9, 1940; PENDLETON: Spruce Knob, *Pixler*, May 22, 1948; PRESTON: along road to Cranesville Glade, *Bartholomew*, June 21, 1942; RALEIGH: foot of Batoff Mountain, *Tosh*, May 10, 1940; RANDOLPH: Point Mountain, *Millsbaugh*, July 12, 1890; SUMMERS: Stony Creek Canyon near Bargers Springs, *Fox*, June 9, 1939; TUCKER: Canaan Valley, *Core*, *Myers* and *Bartholomew*, June 1, 1940; WEBSTER: on Birch Creek, near Cowan, *Fox*, Aug. 10, 1940.

## 4. VIBURNUM

1. Leaves three-lobed or three-ribbed
  2. Petioles and upperside of leaves glabrous, with bristle-like hairs along veins underneath; marginal flowers showy and sterile.....1. *V. americanum*
  2. Petioles and underside of leaves pubescent; all flowers perfect.....2. *V. acerifolium*
1. Leaves not three-lobed or three-ribbed
  2. Leaves heart-shaped; veins beneath rusty-scurfy; marginal flowers showy and sterile.....3. *V. alnifolium*
  2. Leaves not heart-shaped; all flowers perfect
    3. Leaves deeply and sharply dentate
      4. Leaves glabrous or with hairy tufts in the axils underneath.....4. *V. recognitum*
      4. Leaves and petioles pubescent
        5. Leaves stipulate; petioles short (less than  $\frac{1}{2}$  cm. long) .....5. *V. affine* var. *hypomalacum*
        5. Leaves not stipulate; petioles long and slender (more than  $\frac{1}{2}$  cm. long).....6. *V. dentatum*
  3. Leaves not dentate
    4. Leaves crenulate or entire; cyme peduncled.....7. *V. cassinoides*
    4. Leaves sharply serrate; cyme sessile or with short peduncle
      5. Leaves oval to oval-lanceolate, acuminate at apex; winged petiole with wavy margin.....8. *V. Lentago*
      5. Leaves oval or ovate, blunt at apex; winged petiole but margin not wavy.....9. *V. prunifolium*

1. *VIBURNUM AMERICANUM* Mill. Gard. Dict. Ed. 8, no. 8 1768. Cranberry-tree, High-bush Cranberry, Pimbina. In woods and along streams; Newfoundland and eastern Quebec to British Columbia, south to New Jersey and West Virginia, Michigan, Wisconsin and Northeastern Iowa. An upright shrub the fruit of which is a substitute for cranberries, hence the common name. The stipules are filiform. The petiole is grooved and bears round or kidney-shaped stalked glands along the side. The fruit is red. West Virginia includes the southernmost known locality of this plant in the Appalachians where it is found in the high altitude of Tucker County. June-July. The snowball-tree (*V. Opulus* var. *sterile*) is a cultivated form with the whole cyme turned into showy sterile flowers. MONONGALIA: "The Castle" South Park Hill, Morgantown (in cultivation), Sheldon, Aug. 23, 1939; TUCKER: Canaan Valley, upper or southern extremity, Dickey, June 3, 1932.

2. *VIBURNUM ACERIFOLIUM* L. Sp. Pl. 268. 1753. Dockmackie, Arrow-wood, Maple-leaved Viburnum. Rocky woods, New Brunswick to Minnesota, Kentucky and Georgia. A shrub widespread throughout the State. The twigs are pubescent, leaves soft pubescent underneath, smooth above. The stipules are filiform. The underside of the leaves is covered with minute, black glandular dots. The leaves may be three-lobed or three-ribbed. The fruit is well liked by the birds. Since the shrub has a wide range in the State the fruit is probably an important food for the birds in the fall when the fruit ripens. May-



JUNE. BARBOUR: 2 miles south of Philippi, *Core*, July 14, 1937; BERKELEY: on Back Creek at Route 9, *Core*, July 9, 1937; CALHOUN: Arnoldsburg, *Core*, July 1, 1932; DODDRIDGE: along Route 55, 3 miles west of Ashley, *Core*, June 8, 1937; FAYETTE: Beckwith, *West*, May 31, 1937; Nuttallburg, *Nuttall*, May 29, 1892; GRANT: near Bayard, *Mills-paugh*, July 10, 1890; GREENBRIER: at pond on Muddy Creek Mountain, *Fox*, Aug. 31, 1940; HAMPSHIRE: Hanging Rock, *Frye*, Aug. 1933; HANCOCK: Tomlinson's Run Park, *West*, June 13, 1937; HARDY: on shale 5 miles south of Moorefield, *Wilson*, July 20, 1943; HARRISON: Shinnston, *Martin*, July 29, 1933; KANAWHA: Clendenin, *Strickland*, May 26, 1933; LOGAN: Clothier, *Vickers*, July 12, 1944; MARION: Fairmont State Teacher's College; MARSHALL: on bank above Fish Creek near mouth of Lower Bowman Run, *Bartholomew*, June 15, 1940; MERCER: Pinnacle Rock, *Fox*, Sept. 1, 1940; MINGO: Kermit, *Harris*, June 3, 1933; MONONGALIA: Quarry Run, *Hopkins*, July 28, 1907; MONROE: on Little Stony Creek, *Fox*, Aug. 21, 1940; MORGAN: Shale barrens along Cacapon River, 2 miles north of Largent, Route 9, *Core*, July 9, 1937; NICHOLAS: near Nettie, *Fox*, Aug. 9, 1940; OHIO: growing on steep hillside across Middle Wheeling Creek from Girl Scout Camp, *Bartholomew*, Aug. 1936; PENDLETON: 1 mile north Mouth of Seneca, *Core*, July, 1937; POCAHONTAS: (no location given), *Gray*, 1927; PRESTON: Cranberry Glades, *Corbett*, May 22, 1896; RALEIGH: Beckley, *Core*, July 17, 1931; RANDOLPH: Dry Fork, *Core*, July 16, 1938; RITCHIE: Mole Hill on Route 74, *Core*, July 8, 1937; SUMMERS: Bangers Springs, *Fox*, June 24, 1938; TAYLOR: Wickwire Run, 2 miles north of Grafton, *Core*, July 7, 1937; UPSHUR: Selbyville, *Bryner*, June 15, 1948; WAYNE: Wild Cat near left fork of Hurricane Creek, *Lycan*, Sept. 19, 1931; WEBSTER: near Camp Caesar, *Fox*, Aug. 10, 1940; WETZEL: Fish Creek near Littleton, *Core*, June 2, 1931; WIRT: near Owensport, *Bartholomew*, June 7, 1933; WYOMING: 9 1/2 miles southeast of Pineville, Big White Oak Run, *Wilson* and *Friedel*, Aug. 9, 1940.

3. *VIBURNUM ALNIFOLIUM* Marsh Arb. Am. 102. 1785. Hobble-bush, Witch-hobble, Moosewood. Moist woods; New Brunswick to Ontario and Michigan, south to Pennsylvania and in the mountains to North Carolina. This is a straggling shrub, with reclining branches which often take root, found in the mountains of the State. These branches may trip the unwary, hence the common name of Hobble-bush. The ripe fruit is sweet and edible and the birds are fond of it. May-June. PENDLETON: Spruce Knob, *Pixler*, May 22, 1948; NICHOLAS: on Panther Creek, *Fox*, (no date given); POCAHONTAS: Burner Mountain, *Woods*, Aug. 12, 1931; RANDOLPH: Point Mountain, *Mills-paugh*,



July 12, 1890; TUCKER: Backbone Mountain, U. S. Route 218 between Thomas and Parsons, *Core*, May 13, 1939.

4. *VIBURNUM RECOGNITUM* Fernald (*V. dentatum* of authors not L.; *Rhodora* 43:647. 1941). Arrow-wood. Wet places; New Brunswick to northern Georgia, west to western New York and southern Ontario. A glabrous shrub found in moist or wet ground in the eastern counties of the State. The main veins of this and the two following species are straight, ending in the lobes of the leaves. June-July. FAYETTE: River bank near Nuttallburg, *Nuttall*, June 2, 1894; GRANT: Stony River Dam, *Core*, July 1, 1931; GREENBRIER: Muddy Creek Mountain, *W. V. U. Biological Expedition*, July 29, 1931; HAMPSHIRE: Hanging Rock, *Frye*, June 11, 1932; HARDY: Baker, *Core*, Aug. 18, 1931; MARION: along edge of Tygart River at Valley Falls, *Bartholomew*, June 19, 1942; MERCER: Brush Creek Falls, *McNeill*, July 17, 1930; MONONGALIA: Halleck, *Anderson and Smith*, June 27, 1933; NICHOLAS: Summersville, *Bryner*, June 10, 1948; PRESTON: Cranesville, *Brooks*, June 8, 1916; RALEIGH: along New River at Hinton, 1½ miles below bridge, *Tosh*; RANDOLPH: Cranberry Swamp 1 mile north-east of Beverly, *Hutton*, June 30, 1942; SUMMERS: Barksdale, *Boone*, June 15, 1933; TUCKER: Canaan Valley, *Core*, June 29, 1931.

5. *VIBURNUM AFFINE* Bush. var. *HYPOMALACUM* Blake. (*Rhodora* 20:14. 1918.) Downy Arrow-wood. Calcareous ridges and banks; Western Quebec and Vermont, to Manitoba south to Georgia, Illinois, Iowa, and Wyoming. This shrub has been reported from only a few places in the state. The leaves are either sessile or on very short petioles and are smaller than those of the following species. May-June. GRANT: Greenland Gap, *Mr. and Mrs. Davis*, July 11, 1937; GREENBRIER: Kate's Mountain, *W. V. U. Botanical Expedition*, Aug. 3, 1926; MINERAL: Wild Meadow Run, *W. V. U. Botanical Expedition*, Aug. 22, 1928; PENDLETON: Shenandoah Mountain, *Mr. and Mrs. Davis*, June 1, 1940.

6. *VIBURNUM DENTATUM* L. (*Viburnum pubescens* (Ait.) Pursh., *V. scabrellum* (T. & G.) Chapm., *Rhodora* 43:647.) Woods and banks of streams; Pennsylvania to Florida and Texas. A shrub with reddish brown twigs. The leaves above and underneath, petioles, twigs and cymes are all pubescent. This is a southern species and has been reported from only one county in the state. June. MERCER: Athens 4-H Camp, *W. V. U. Biological Expedition*, July 19, 1929.

7. *VIBURNUM CASSINOIDES* L. Sp. Pl. Ed. 2 384. 1762. Withe-rod, Wild Raisin. Swamps and open situations; New Foundland to North Carolina, Minnesota and Manitoba. A shrub found in wet places in the mountains of the State. The peduncle equals or is less than the

cyme. The blue-black fruits are sweet and edible and are probably an important food of the birds in the mountain regions of the State. June-July. GRANT: wet area near Dolly Sods Tower, *W. V. U. Biological Expedition*, July 17, 1941; GREENBRIER: near pond on Muddy Creek Mountain, *Fox*, Aug. 31, 1940; MONONGALIA: Route 56 near Halleck, *Core*, July 31, 1931; NICHOLAS: on Panther Creek, *Fox*, Aug. 9, 1940; POCAHONTAS: Williams River, *Core*, Aug. 5, 1931; PRESTON: Cranesville Swamp, *Hopkins*, June 23, 1897; RALEIGH: near Jumping Branch, *Boone*, Sept. 7, 1933; RANDOLPH: Cheat Bridge, *Hutton*, June 18, 1939; SUMMERS: near Talcott, *Boone*, Aug. 3, 1933; TUCKER: Red Creek Plains, *Core*, July 13, 1935; UPSHUR: Alexander, *Core*, Aug. 29, 1938; WEBSTER: Upper Glade, *Millspaugh*, July 15, 1890.

8. *VIBURNUM LENTAGO* L. Sp. Pl. 268. 1753. Sweet Viburnum, Sheepberry, Nannyberry. Woods and banks of streams; Quebec to Manitoba and southward. A large shrub or tree with flexuous branches. The cyme is sessile. The fruit is sweet and edible, but since the shrub is not common in the State is not an important food for wildlife. May-June. OHIO: (in cultivation) Serpentine Drive, Oglebay Park, *Strausbaugh*, May 18, 1929; POCAHONTAS: 2 miles north of Frost, *Core*, June 3, 1947; PRESTON: Cranesville, *Fling*, June 8, 1916; TUCKER: Canaan Valley, *Core*, July 15, 1933.

9. *VIBURNUM PRUNIFOLIUM* L. Sp. Pl. 268. 1753. Black Haw. Dry moist ground; Connecticut to Michigan, Kansas and southward. A shrub with stiff spreading branches common in the State. The cyme is sessile or with very short peduncle. The fruit is the common Black Haw which is eaten in the late fall by country folk and birds. May-June. BERKELEY: 2 miles south of Tomahawk, *Core*, July 10, 1937; CABELL: open pasture, Huntington, *Gilbert*, April 20, 1929; CALHOUN: Orma, *Harris*, Sept. 7, 1934; FAYETTE: Nuttallburg, *Nuttall*, May 3, 1892; GRANT: Cabins, *Southern Appalachian Botanical Club*, April 29, 1939; GREENBRIER: near Lewisburg, *Fox*, Aug. 31, 1940; HAMPSHIRE: Hanging Rock, *Frye*, June 18, 1932; HARDY: Baker, Mr. and Mrs. Davis, June 18, 1942; HARRISON: Shinnston, *Martin*, Aug. 1933; KANAWHA: Nitro near Golf Course, *Greenlee*, Sept. 28, 1934; MARSHALL: in woods above Fish Creek at mouth of Lower Bowman Run, *Bartholomew*, June 15, 1940; MARION: Rivesville, *Bodola*, July 25, 1944; MERCER: near Princeton, *Fox*, Sept. 1, 1940; MONONGALIA: Morgantown, *Rumsey*, May 11, 1893; MONROE: Wayside, *Fox*, Aug. 1, 1940; RITCHIE: along Route 74, 7 miles north of Pennsboro, *Core*, July 8, 1937; SUMMERS: Hinton, *Millspaugh*, Aug. 12, 1891; TYLER: near Shirley, *Brooks* and *Margolin*, May 8, 1937; WAYNE: Fort Gay,

*Lycan*, Sept. 29, 1931; WIRT: near Owensport, *Bartholomew*, June 16, 1932.

### 5. DIERVILLA

1. DIERVILLA LONICERA Mill. Gard. Dict. Ed. 8. 1768. Bush Honey-suckle. In dry woodlands or in thickets; from Maine south in the mountains to North Carolina, and west to Michigan and Minnesota. A glabrous shrub with serrate, sometimes ciliate leaves. The yellow, funnel-shaped flowers are 1 to 5 in a cluster. The fruit is distinctive being a many-seeded capsule with a beaked tip and the long calyx lobes persistent. June. GRANT: Stony River Dam, *Core*, no date; HAMPSHIRE: Ice Mountain, *Frye*, July 21, 1932; MERCER: Brush Creek Falls, *McNeill*, July 18, 1930; MONONGALIA: Station Farm, *Hopkins*, June 15, 1896; POCAHONTAS: Bald Knob, *W. V. U. Botanical Expedition*, Aug. 2, 1928; PRESTON: Top of Briery Mountain, *Mr. and Mrs. Davis*, June 10, 1944; RANDOLPH: Roaring Plains, *Core*, July 21, 1931; SUMMERS: Panther Knob, no collector, July 13, 1935; WETZEL: Fish Creek near Littleton, *Core*, June 2, 1921.

### 6. SYMPHORICARPOS

1. SYMPHORICARPOS ORBICULATUS Moench. Meth. 503. 1794. Indian Currant, Coral Berry. Rocky banks; New York to Dakota, south to Georgia and Texas; escaping from cultivation eastward. A shrub with short-petioled, ovate leaves, gray pubescent underneath. The inconspicuous bell-shaped flowers are borne in the axils of most of the leaves. The berries are red. This shrub is a native of West Virginia. Many of the early settlers apparently used it for ornamental planting around their homes, and although the houses have disappeared the shrub has remained and thrived. This makes it difficult in many cases to determine whether it has escaped from cultivation or has been established naturally. July. CABELL: near Milton, *Williams*, Oct. 25, 1935; FAYETTE: roadside *Nuttall*, 1890-1898; HAMPSHIRE: Hanging Rock, *Frye*, Aug. 20, 1932; MONONGALIA: Uffington, *Mr. and Mrs. Davis*, Sept. 1, 1940; MONROE: near Wolf Creek Postoffice, *Fox*, Aug. 31, 1940; SUMMERS: near Hinton, *Boone*, June 20, 1940; WAYNE: along Big Sandy River 2 miles north of Fort Gay, *Lycan*, Sept. 26, 1931; WEBSTER: *Williams River*, *Mr. and Mrs. Davis*, Aug. 31, 1937; WIRT: along bank of Chestnut Run, *Bartholomew*, Aug. 7, 1937.

### 7. LONICERA

1. Upright shrubs
  2. Glabrous; leaves strongly ciliate; peduncles long (approx. 1.4-3 cm. long)-----1. *L. canadensis*
  2. Pubescent; leaves not ciliate; peduncles short (approx. 3-7 mm. long)-----2. *L. Morrowii*
1. Climbing or trailing vines

2. Pubescent; flowers axillary.....3. *L. japonica*  
 2. Glabrous; flowers terminal  
 3. Leaves oval or obovate; corolla almost regular,  
 stamens and style barely exerted.....4. *L. sempervirens*  
 3. Leaves oval or ovate, pointed at each end; corolla  
 bilabiate, stamens and style conspicuously exerted.....5. *L. dioica*

1. *LONICERA CANADENSIS* Marsh. Arb. 81. 1785. American Fly Honey-suckle. In moist woods; Nova Scotia to Saskatchewan, Connecticut, West Virginia, Indiana, Michigan and Minnesota. This is a glabrous shrub with spreading branches. The leaves are strongly ciliate and the pairs of fruits are connate at the base. May. MERCER: Brush Creek Falls, *W. V. U. Botanical Expedition*, July 17, 1929; PENDLETON: Spruce Knob, *Mr. and Mrs. Davis*, May 15, 1937; POCAHONTAS: Bald Knob, *W. V. U. Botanical Expedition*, July 20, 1927; PRESTON: Along road in Monongahela National Forest near Breedlove, *Core and Bartholomew*, May 15, 1943; RANDOLPH: Cheat Bridge, *Core and Strausbaugh*, June 8, 1933; TUCKER: Swamp, Canaan Valley, *W. V. U. Botanical Expedition*, July 10, 1941.

2. *LONICERA MORROWII* Gray. A Japanese shrub that has escaped from cultivation. This is an upright shrub with leaves grey underneath and pubescent. MONONGALIA: In thicket along river at Seneca near Morgantown, *Mr. and Mrs. Davis*, April 23, 1946; URSHUR: escaped along roadside near Hodgesville, *Mr. and Mrs. Davis*, April 19, 1946.

3. *LONICERA JAPONICA* Thunb. F. Jap. 89. 1784. Japanese Honey-suckle. Escaped from cultivation, Connecticut, New York and Pennsylvania to North Carolina, Florida, and West Virginia. This is a trailing vine with thick leaves, smooth above and has leaf-like bracts below the inflorescence. This plant is useful in the State for holding steep banks. With their profuse growth and almost evergreen leaves, the vines provide winter shelter for birds. The birds also eat the berries. May-July. BERKELEY: Mill's Gap, *Mr. and Mrs. Davis*, July 26, 1939; GREENBRIER: near Lewisburg, *Fox*, Aug. 31, 1940; HAMPSHIRE: North River Mills, *Frye*, July 21, 1932; HARDY: widely established along road near Moorefield, *Mr. and Mrs. Davis*, June 11, 1937; KANAWHA: Nitro, *Greenlee*, Sept. 28, 1934; MERCER: near Pinnacle Rock, *Fox*, Sept. 1, 1940; MONONGALIA: Cassville, *Watkins*, Oct. 7, 1935; OHIO: Oglebay, *Strausbaugh*, June 17, 1929; RALEIGH: common along bank below spring on left of river near Hinton, *Tosh*, June 10, 1940; SUMMERS: Bargets Springs, *Fox*, June 8, 1939; WAYNE:  $\frac{1}{2}$  mile north of Fort Gay, near railroad, *Lycan*, Sept. 30, 1931; WEBSTER: near Cowan, *Fox*, Aug. 9, 1940; WIRT: above mouth of Reedy Creek, *Bartholomew*, July 21, 1934.

4. *LONICERA SEMPERVIRENS* L. Sp. Pl. 173. 1753. Trumpet Honeysuckle. In low ground or on hillsides; Maine to Florida, New Hampshire, New York, Nebraska and Texas. The trumpet-shaped corolla is nearly 5 cm. long, with the stamens and style barely exerted. The upper leaves are connate-perfoliate. If this species is found growing wild in the State it has escaped from cultivation. April-Sept. LEWIS: along graveyard, Jackson's Mill, *Margolin*, Aug. 14, 1938; MONONGALIA: Cassville, *Watkins*, Oct. 11, 1935; RANDOLPH: Pickens, *Perine*, 1936.

5. *LONICERA DIOICA* L. Syst. Ed. 12, 165, 1767. Smooth Honeysuckle. Rocky grounds; southern Maine to Manitoba, south to North Carolina, Ohio and Missouri. This is a glabrous shrub with upper leaves connate-perfoliate found in a few counties of the State. May-June. HAMPSHIRE: Okonoko, *Frye*, May 18, 1935; MERCER: Brush Creek Falls, *W. V. U. Botanical Expedition*, July 17, 1929; MONONGALIA: Dunkard Creek, *Mr. and Mrs. Davis*, May 23, 1937; RITCHIE: near Cairo, *Goodwin*, April, 1930; TUCKER: Canaan Valley, *Core*, Oct. 24, 1936.

WEST VIRGINIA UNIVERSITY  
MORGANTOWN

## The Genus *Hieracium* in West Virginia\*

JAMES C. MYERS

### Introduction

During the Spring of 1948 the author found, growing abundantly at Hopemont, West Virginia, a species of *Hieracium* which was typical of neither *Hieracium pratense* Tausch nor *Hieracium floribundum* Wimm. and Grab. but possessing traits of both these species. This led to a study of the West Virginia species of this genus and after completing the study it still remains the most perplexing problem encountered in the work.

The source material was limited to dried specimens from the West Virginia University Herbarium except for a few specimens from the Gray Herbarium of Harvard University, The New York Botanical Garden, The Carnegie Museum of Pittsburgh and the private Herbarium of Dr. and Mrs. H. A. Davis. The large number of misidentified specimens gives ample testimony that a more clear and simple key is needed to our species. Such a key plus a drawing of each species by Miss Joyce Georgalis will, it is hoped, greatly facilitate the identification of all members of this genus found in West Virginia.

In "The Living Flora of West Virginia", a checklist by C. F. Millspaugh published in 1913, there were included seven species of *Hieracium*. Dr. E. L. Core's "A Catalogue of the Vascular Plants of West Virginia" (Castanea Vol. 5 No. 3-4 March-April 1940) listed twelve species of this genus. The present work includes ten species, one being added to the 1940 checklist and three species eliminated. The latter species are discussed under Excluded Species.

Four of our species have come to us from Europe via the Appalachians from Eastern Canada and New England. Distribution maps made from existing collections would indicate that about half of our species are statewide in distribution and the other half primarily limited to the Alleghanies.

The economic importance of *Hieracium* in West Virginia is on the negative side. The introduced species in particular are troublesome weeds. Deam mentions that *H. aurantiacum* is cultivated as an ornamental in Indiana. The reddish orange flowers of this species are very attractive but the danger of their escaping and persisting as weeds makes their cultivation inadvisable.

The preparation of the key has been facilitated by a careful study of the *Hieracium* sections of Gray's *New Manual of Botany*, Seventh

\*Contribution No. 52 from the Herbarium of West Virginia University.



Edition, *Flora of the Northeastern United States and Canada*, by Britton and Brown, *Flora of Indiana* by C. C. Deam, and *Flora of Illinois* by G. N. Jones. The nomenclature follows the seventh edition of Gray's *New Manual of Botany* with one exception.

#### KEY TO THE WEST VIRGINIA SPECIES OF HIERACIUM

1. Scapose (frequently one or two stem leaves near the base)
  2. Inflorescence a solitary head (rarely 2-4); scape usually less than 2 dm. tall.....2. *H. pilosella*
  2. Inflorescence several- to many-headed; scape usually much taller
    3. Stems hirsute and glandular; rootstocks slender and elongate; stolons present
      4. Leaves hirsute on both surfaces; stems not glaucous; inflorescence dense, peduncles rather short
        5. Flowers orange-red, becoming dark red with age and in dried specimens.....1. *H. aurantiacum*
        5. Flowers yellow.....4. *H. pratense*
      4. Leaves glabrous above, hirsute along margin and midrib beneath, stems glaucous; inflorescence less dense, peduncles longer.....3. *H. floribundum*
    3. Stems glabrous between base and inflorescence; rootstocks short, truncate; stolons absent
      4. Peduncles densely glandular and tomentose; leaves not purple veined.....5. *H. Traillii*
      4. Peduncles sparsely glandular, not tomentose; leaves usually purple veined.....6. *H. venosum*
1. Stems leafy
  2. Basal leaves having fallen by flowering time, (if present withered and brown)
    3. Plants rough-hairy, peduncles thick and glandular-tomentose.....7. *H. scabrum*
    3. Plants glabrous except lower 1/3 of stem, peduncles lax, slender and glabrous (or nearly so).....8. *H. paniculatum*
  2. Basal leaves persistent
    3. Inflorescence narrowly cylindric, racemose-paniculate; achenes fusiform.....9. *H. Gronovii*
    3. Inflorescence broad, corymbose-paniculate; achenes columnar.....10. *H. marianum*

#### Notes to Species

1. *H. AURANTIACUM* L. Orange Hawkweed or Devils-paint-brush. An ugly weed with a beautiful flower. The distribution of this species in West Virginia would indicate that it probably reaches its southeastern limits in the State. It reaches south to the tip of the northern panhandle and farther south in the Alleghanies to the East. County records: Grant, Hancock, Pocahontas, Tucker.

2. *H. PILOSELLA* L. Mouse-ear. This is the second of our four species which have become naturalized from Europe; whose leafy stolons distinguish them from our native species. This is our smallest hawkweed and bears the fewest heads. It has been found only in the mountainous counties in the southeastern portion of the state. County

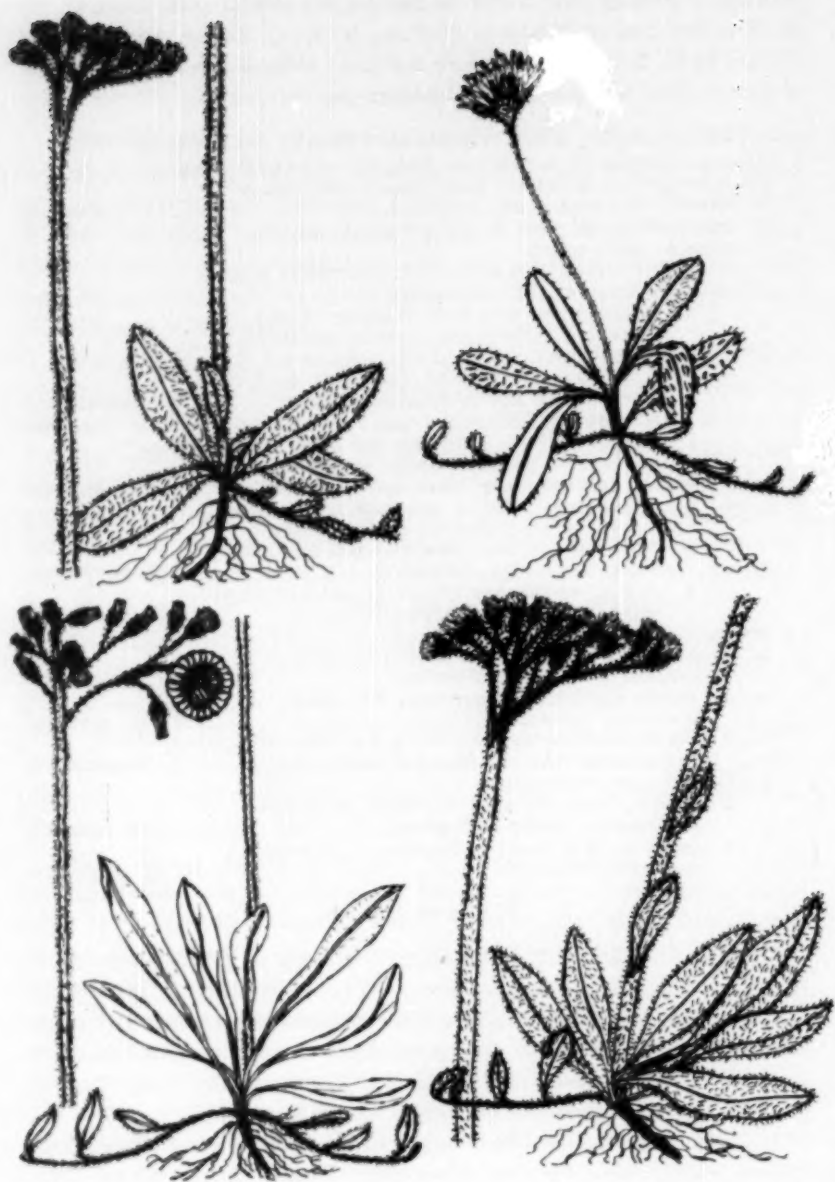


Fig. 1. Left to right, above, *H. aurantiacum*, *H. pilosella*; below, *H. floribundum*, *H. pratense*.

records: Greenbrier, Mercer, Nicholas, Raleigh, Randolph, Summers, Webster.

3. *H. FLORIBUNDUM* Wimm. and Grab. This species and the next constitute a complex in West Virginia which has not been clarified by this study. The author regrets that he is not equipped at this time to make the comprehensive study which would be required in order to shed light on the true nature of this complex. The overall picture obtained from the examination of the specimens would lead one to think it were one broad species with typical *H. floribundum* at one extreme and typical *H. pratense* at the other. Most of our specimens seem to be a blend of the typical characters of each species. These two species are very closely related and it seems likely that they would hybridize. It is possible that there may be a series of ecological forms or mutations but the fact that many specimens do not resemble one species more than the other would tend to add weight to the hybrid theory. Typical specimens of either species are uncommon in our material.

Typical *H. floribundum* is a more delicate species than *H. pratense*, the stems are thinner and somewhat less hairy, (both species have three types of trichomes viz., needle shaped, glandular, and stellate). The branching corymb is generally longer, broader and with about half the number of heads per volume of inflorescence. Stems are glaucous, and leaves glabrous, except along the margins and on the midrib of the lower surface. The leaves are more narrow and of a lighter shade of green. At the time of publication of Gray's New Manual of Botany, seventh edition, *H. floribundum* was not known to exist south of Maine. County records of more typical specimens: Calhoun, Grant, Summers.

4. *H. PRATENSE* Tausch. King Devil. The 1908 edition of Gray's Manual lists the southern limits of this species as southern New York. The earliest West Virginia specimen was collected by Dr. John L. Sheldon in Monongalia county in 1916. These two species are among our most troublesome and fastest spreading weeds. They have spread over a large portion of this state in a comparatively few years. Their stoloniferous habit enables them to cover a meadow very readily.

Typical *H. pratense* is a coarser plant than *H. floribundum*, it has stouter and more hairy stems and peduncles. The corymb tends to be less branched having a dense cluster of closely packed heads on short peduncles. The stems are not glaucous. The leaves are hirsute on both surfaces, broader and of a darker green color. County records of the more typical specimens: Fayette, Greenbrier, Hampshire, Kanawha, Mineral, Monongalia, Wirt.

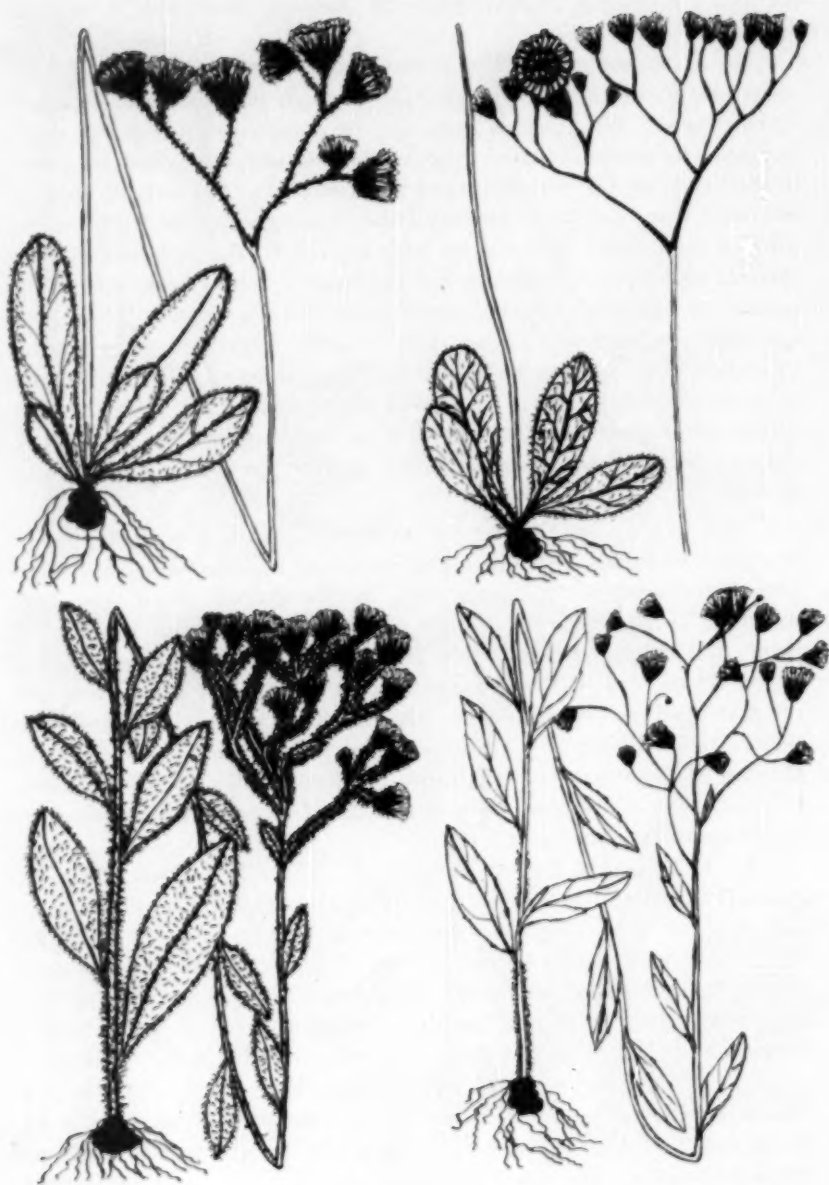


Fig. 2. Left to right, above, *H. traillii*, *H. venosum*; below, *H. scabrum*, *H. paniculatum*.

County records of specimens which are typical of neither species but having characteristics of both: Braxton, Calhoun, Grant, Greenbrier, Mineral, Monongalia, Preston, Raleigh, Randolph, Webster.

In Europe *H. pratense* Tausch is a broad species with twenty-seven subspecies. The subspecies of the naturalized American plant was probably originally *H. pratense* subsp. *colliniforme* Zahn which H. W. Pugsley (A Prodrum of the British Hieracia—Jour. Linn. Soc. of London 54: 1-4, 1-356, 1948) elevates to species rank as *H. colliniforme* (N. P.) Roffey. According to Zahn's monograph in Das Pflanzenreich—280 (4), 1923, *H. floribundum* Wimm. and Grab. is intermediate between *H. pratense* Tausch and *H. Auricula* Lamk. and DC. He does not list it for North America. A European Hieraciologist is needed to shed light upon this complex.

5. *H. TRAILLII* Greene (*H. Greenii* Porter and Britton). This is our shale barren species found in four counties of the mountainous Eastern Panhandle. In this area it is possible that these may hybridize with *H. venosum*, as some specimens found are very close to each. The name *H. Traillii* Greene is being used in this treatise instead of *H. Greenii* Porter and Britton for the following reasons, as supplied by Dr. H. A. Allard of the Smithsonian Institution. Dr. Asa Gray named a western species *H. Greeneii* in 1883. Porter and Britton named our different eastern species *H. Greenii* in 1893. The latter name is not valid being practically identical with the already named western species so it was named *H. Traillii* by Greene in 1900. County records: Grant, Hardy, Mineral, Pendleton.

6. *HIERACIUM VENOSUM* L. Rattlesnake-weed. This is our most common hawkweed and undoubtedly grows in every county. We have specimens from twenty-six of the fifty-five counties; collectors frequently pass up such common weeds. Occasionally within the state one may find specimens of this species with one to six cauline leaves (*H. venosum* L. var. *subcaulescens* Torr and Gray); the purple-veined basal leaves will still mark it as *H. venosum* L. The author found a few specimens having the upper surfaces of the basal leaves setose but they were collected in scattered areas of the state and there seemed to be no correlation with elevation or latitude. The branching of this species tends to be more dichotomous than in any other of our species. County records: Berkeley, Boone, Braxton, Cabell, Calhoun, Doddridge, Grant, Greenbrier, Hampshire, Hardy, Kanawha, Marion, Marshall, Mercer, Mingo, Monongalia, Morgan, Pocahontas, Preston, Raleigh, Randolph, Summers, Upshur, Wayne, Wetzel, Wirt.

7. *H. SCABRUM* Michx. Rough Hawkweed. This species is common throughout the state and is recognized by its thick, densely glandular peduncles. With rare exceptions, the plants of this species and the one following have dropped their basal leaves by flowering time. County records: Calhoun, Hampshire, Harrison, Mineral, Monongalia, Ohio, Preston, Raleigh, Randolph, Tucker, Upshur, Wayne, Wetzel, Wirt, (Millspaugh cites records of *H. scabrum* Michx., *H. paniculatum* L. and *H. Gronovii* L. from Fayette County, near Nuttallburg, collected by L. W. Nuttall but the author was not able to locate these specimens.

8. *H. PANICULATUM* L. Among our species *H. paniculatum* is unique in having significant teeth along the margins of the stem leaves. The base of the stem is pilose-pubescent in contrast to the glabrous upper portions. The few collection records are widely distributed throughout the state so that one may assume that it is growing in every county. County records: Calhoun, Greenbrier, Hardy, Kanawha, Monongalia, Pendleton, Pocahontas, Preston, Raleigh, Randolph, Summers, Webster.

9. *H. GRONOVII* L. One of our most common Hawkweeds but certainly the most frequently misidentified. Two distinguishing



Fig. 3. Left to right, *H. Gronovii*, *H. marianum*.



characteristics separate this species from all other West Virginia *Hieracia*: The achenes are not columnar but taper from the middle into a narrow-necked summit. The inflorescence is racemose-paniculate while those of our other species are corymbose, corymbose-paniculate or solitary. Our specimens seem to be typical *H. Gronovii* L. The author has seen a specimen of *H. Gronovii* L., var. *foliosum* Michx. from Wake County, North Carolina which is quite distinct from any in our flora. We have no records of this species south of a line extending through Wayne, Kanawha and Randolph Counties. Considering the overall range of the species and the limited state records there seems little reason for attaching significance to this fact. County records: Cabell, Calhoun, Hampshire, Harrison, Jackson, Kanawha, Monongalia, Preston, Putnam, Randolph Upshur, Wayne Wetzel, Wirt.

10. *H. MARIANUM* Willd. The distribution of this species is given as follows: New Hampshire to Ohio southward to Mississippi. We have but two different specimens from West Virginia, one of which is somewhat doubtful; and from the above distribution it would seem that it should be more common in the state. Perhaps the distribution is as unpredictable as the plants themselves. Dr. M. L. Fernald has this to say about them: "The highly plastic series of plants known as *H. marianum* Willd. seems to be a group of more or less perpetuating hybrids with *H. venosum* L. as one parent, *H. Gronovii* L. often, or northward, *H. scabrum* Michx. as the other. The resultant maze is very complex. It is our nearest approach to the baffling series of apomicts and mixed progeny with which the European students of *Hieracium* are familiar." County records: Hampshire, Webster.

#### Excluded Species

Three species of *Hieracium* included in the checklists of Millspaugh (1913) and Core (1940) have been omitted from the list of species in our flora as treated in this work.

*H. CANADENSE* Michx. Canada Hawkweed. The author has seen no specimen of *H. canadense* Michx. collected in West Virginia. The specimen upon which the former record was based: (Webster County, Upper Glade, July 18, 1890, C. F. Millspaugh no. 547) was identified and labeled *H. canadense* Michx. by Millspaugh, but it was a misidentification. It is certainly not *H. canadense* Michx. as labeled but seems rather to be a young specimen of *H. marianum* Willd. True *H. canadense* Michx. does not reach as far southward as the northern boundaries of West Virginia.

*H. LONGIPILUM* Torr. Long-beard Hawkweed. The following specimens were cited by Millspaugh in his 1913 checklist for *H. longi-*

*pilum* Torr: Monongalia Co.: Decker's Creek, near Morgantown Sept. 8, 1890, C. F. Millspaugh No. 800; Fayette Co.: near Kanawha Falls, and Hawk's nest, J. F. (James). The author has seen the Monongalia County specimen and it is typical *H. Gronovii* L. and not *H. longipilum* Torr. as labeled. Millspaugh stated that the collections of J. F. James were to be found in the Gray Herbarium of Harvard University but a search at that institution failed to disclose the cited specimen. It seems reasonable to the author that the James specimen may also have been misidentified for *H. longipilum* Torr. is a species typical of the midwestern prairies and it would be very surprising to find it growing in the mountains of Southern West Virginia. The confusion between *H. Gronovii* L. and *H. longipilum* Torr. was probably due to the fact that both species have fusiform achenes. *H. longipilum* Torr. can be quickly recognized by the long appressed hairs of the stem and leaves fully three times as long as any found on *H. Gronovii* L.

*H. ALLEGHANIENSE* Britton. After a careful study of this species including the type specimen, the author has decided not to include it among the living species to be found in West Virginia. The type specimen (Preston Co., W. Va.—near Aurora, 3000 ft., August 29, 1898, collected by Mr. and Mrs. E. S. Steele) collected fifty years ago seems to be the only specimen in existence. It has never been found since to the author's knowledge, although it has been the object of numerous searches throughout the Alleghenies and particularly in the vicinity of the type locality. It seems likely that this plant was a mutant or hybrid which for one or more reasons did not survive. The vegetative portions of this plant seem to resemble some specimens of *H. scabrum* Michx. very closely and the latter is a probable parent. The other parent in this hypothetical cross could have been *H. paniculatum* L. Both of these species were growing in this area when the type of *H. alleghaniense* Britton was collected and all three have the common trait of having lost their basal leaves by flowering time. In the Illustrated Flora of the Northeastern United States and Canada by Britton and Brown (1913) *H. alleghaniense* Britton is neither described, illustrated, nor included in the key, but merely mentioned in a footnote. Was this due to its restricted range or did Dr. N. L. Britton have some doubt in his mind concerning this species?

#### Acknowledgements

The pursuit of a study of this type in an isolated location such as Hopemont, requires unusual cooperation and this the author has received especially from Miss Elizabeth Bartholomew and Dr. Earl L.

Core of the Department of Biology of West Virginia University. Dr. Core's ready assistance was indispensable from loan of specimens to publication. Acknowledgements are due to Miss Joyce Georgalis, through whose talent and cooperation typical specimens have been realistically represented by sketches, thus adding considerable value to the work. Thanks are also due to Dr. M. S. Lauder for on-the-spot advice whenever needed.

UNIVERSITY OF ILLINOIS  
URBANA

## The Family Hypericaceae in West Virginia\*

ELIZABETH ANN BARTHOLOMEW

This paper is an attempt to revise the classification of the Hypericaceae of West Virginia. Since most of the members of this family are inconspicuous late summer blooming flowers that last but a day, they have not been collected in great numbers nor has any critical study of this group been made heretofore in this State.

C. F. Millspaugh's "Living Flora", published in 1913, lists 2 genera of Hypericaceae, including 11 species of *Hypericum* and one of *Ascyrum*. Core's Catalogue (1940) includes 14 species and one variety of *Hypericum* as well as one species of *Ascyrum*. In this study, the number of species of *Hypericum* has been reduced to 12. The author has seen specimens of all but one species included in Millspaugh's list. This one, listed as *H. gymnanthum*, is on file at Gray Herbarium and has been determined as *H. mutilum*, according to Dr. Lyman B. Smith. *H. adpressum* Barton, a coastal plain plant, was also listed by Millspaugh, but no State specimen of this species could be found to confirm the report. Other species in Core's Catalog but not in Millspaugh's Flora are *H. petiolatum* var. *t. bulbosum*, *H. boreale* and *H. Drummondii*. Two hundred sixty-eight specimens from the Herbarium of West Virginia University were critically studied.

In preparing the artificial key to species, free reference has been made to Gray's *New Manual of Botany*, seventh edition, and Britton and Brown's *Flora of the Northeastern United States and Canada*, second edition.

The writer wishes to thank Dr. Earl L. Core for the assistance and encouragement rendered in the preparation of this study and the various collectors whose specimens deposited in the Herbarium have made this study possible.

### Key to the Genera

- |                       |  |                     |
|-----------------------|--|---------------------|
| 1. Sepals 4; petals 4 |  | 1. <i>Ascyrum</i>   |
| 1. Sepals 5; petals 5 |  | 2. <i>Hypericum</i> |

### I. ASCYRUM

1. *ASCYRUM HYPERICOIDES* var. *MULTICAULE* (Michx.) Fernald. St. Andrew's Cross has but 4 sepals and 4 petals. The arrangement of these gives the common name to the low, bush-like plant that is quite common in the dry woods of West Virginia.

CABELL: Roland Park, *Gilbert* 548, October 11, 1936; near Rickett's Place, *Gilbert and Gilbert* 297, November 17, 1934. CALHOUN: Freed, *Harris*, June 22, 1933; Pink, *Harris*, August 6, 1933. CLAY:

\* Contribution No. 49 from the Herbarium of West Virginia University.

1 mi. n. of Clay, *Core*, July 19, 1937. FAYETTE: 5 mi. n. e. of Fayetteville, *Bishop*, April 25, 1947; dry banks, *Nuttall* 648, August 17, 1892; near Beckwith, *Core* 4235, July 8, 1932. GILMER: Glenville, *Grose* and *Grose*, August 1, 1946. HAMPSHIRE: Capon Springs, *Core* 3795, August 19, 1931; near The Trough, *Core*, *Frye* and *Strausbaugh*, August 2, 1947. HARDY: Wardensville, *Core* and *Ludwig* 4364, August 10, 1932. HARRISON: Duck Creek, *Martin* 320, August 1933. KANAWHA: Barren Creek, *Randolph* 58, August 1935; Watts Hill, *Greenlee*, July 31, 1934. LINCOLN: 1 mi. s. of Myra, *Richmond* 114, August 18, 1938. MARION: 2 mi. w. Meadow Dale, *Orton*, September 9, 1945. MERCER: near Athens, *Fox*, September 1, 1940. MORGAN: Great Cacapon, *Mr. & Mrs. Davis* 3089, July 27, 1939. MONONGALIA: Booth Creek, *Mr. & Mrs. Davis* 1114, August 9, 1937; Uffington, *Zuccherro*, August 11, 1931. NICHOLAS: near Nettie, *Fox*, August 9, 1940; Mumble-the-peg Creek, *Millsbaugh* 591, July 17, 1890. PUTNAM: Teays Valley, *W.V.U. Bot. Exped.*, August 13, 1926. RALEIGH: Stanford, *Tosh* 586, August 28, 1940. SUMMERS: Brooks, *Boone* 583, July 31, 1933. UPSHUR: Alexander, *Core*, August 29, 1938. WAYNE: Cabwaylingo State Forest, *Wilson & Friedel*, August 2, 1940; ½ mi. n. of Ft. Gay, *Lycan* 129, October 10, 1931. WEBSTER: Point Mt., *Mr. & Mrs. Davis* 1475, August 18, 1937. WIRT: ½ mi. up Little Kanawha River from Palestine, *Bartholomew* W1941-1087; ½ mi. above mouth of Reedy Creek, *Bartholomew* 158, September 6, 1934.

## 2. HYPERICUM

### Key to the Species

1. Petals not yellow
  2. Leaves sessile or clasping-----11. *H. virginicum*
  2. Leaves narrowed to distinct petioles-----12. *H. petiolatum*
1. Petals yellow
  2. Stamens more than 12
    3. Shrubs
      4. Pods 1-1.5 cm. long; flowers 12 mm. long-----1. *H. prolificum*
      4. Pods 5-8 mm. long; flowers less than 12 mm. long-----2. *H. densiflorum*
    3. Herbs
      4. Petals marked with black dots
        5. Petals bearing black dots on margins-----3. *H. perforatum*
        5. Petals bearing several rows of black dots or lines-----4. *H. punctatum*
      4. Petals not marked with black dots
        5. Stems herbaceous, from slender creeping freely stoloniferous bases-----5. *H. ellipticum*
        5. Stems woody at base, or if herbaceous, without slender stolons-----6. *H. virgatum*
  2. Stamens 5-12
    3. Stem simple or loosely branched; leaves linear to ovate
      4. Leaves orbicular, ovate-deltoid, or rounded-oblong, clasping-----7. *H. mutilum*
      4. Leaves lanceolate to linear; merely sessile (if clasping, with lance-attenuate outline)-----8. *H. canadense*

3. Stems fastigiately branched; leaves scale-like or linear-subulate, strongly ascending.  
 4. Leaves 6-20 mm. long.....9. *H. Drummondii*  
 4. Leaves shorter, scale-like.....10. *H. gentianoides*

1. *H. PROLIFICUM* L. Shrubby St. Johnswort is the largest of the *Hypericums*. The flowers are quite large (1 cm. or more across). They are a bright yellow color, grow in open places along roads, edge of woods and open fields in rather dry soil. July-August. FAYETTE: rocky banks, *Nuttall*, August 4, 1892. GRANT: near Cabins, *Wilson*, August 3, 1941. GREENBRIER: on Muddy Creek Mountain, *Fox*, August 31, 1940. HAMPSHIRE: Augusta, *Frye*, July 22, 1932; Ice Mountain, *Frye* 712, July 21, 1932; Hanging Rock, *Frye* 1150, August 27, 1932. HARDY: near Moorefield, *Brooks*, July 19, 1936. HARRISON: near city dam, Lumberport, *Sharps*, July 11, 1939; near Clarksburg, *Judy*, summer 1934. MASON: 2 mi. s. e. of Ambrosia, *Core* 6554, July 19, 1937. MINERAL: Patterson Creek flood plain, *Taylor*, August 2, 1933. MONONGALIA: Cheat River, *Spangler*, August 3, 1912; Morgantown, *Corbett*, July 22, 1897; *Core*, *Bartholomew*, July 17, 1946; Lake Lynn, *Anderson & Smith*, July 12, 1933. MONROE: Union, *Core* 4783, August 13, 1935. NICHOLAS: where Route 94 crosses Gauley River, *Fox*, August 9, 1940. PENDLETON: 1 mi. n. of Seneca, *Core* 6141; above Brandywine, *Allard* 9687, September 24, 1941. PRESTON: Bretz, *Fling*, July 21, 1917. RALEIGH: Glade Creek, *Tosh* 620, August 23, 1940. SUMMERS: along Bluestone River, *Boone* 269, July 29, 1933. WAYNE: Buffalo Creek, *Plymale* 48, July 15, 1937. WETZEL: east of Littleton, *Haight*, July 17, 1931. WIRT: near Owensport, *Bartholomew*, June 25, 1932.

2. *H. DENSIFLORUM* Pursh. Dense-Flowered St. Johnswort. Similar to the preceding plant. The stems are more densely flowered with smaller flowers. This plant grows in moist soil and is found in the mountain counties of the State. July-September. GRANT: badly eroded pasture, *Kuykendall*, August 1, 1945. HAMPSHIRE: Hanging Rock, *Frye* 1390, September 25, 1932; *Frye* 1468, August 24, 1932. HARDY: near Moorefield, *Brooks*, July 19, 1936. MONONGALIA: Morgantown, *Zuccherro*, fall of 1931; Gum Spring, *Mr. & Mrs. Davis* 1741, September 29, 1937; *Halleck*, *Anderson & Smith*, June 27, 1933; Ice's Ferry, *Hopkins*, July 28, 1907. MONROE: near Wayside, *Fox*, August 1, 1940. NICHOLAS: where Route 94 crosses Gauley River, *Fox*, August 9, 1940. PRESTON: Cranesville Glades, *W. V. U. Bot. Exped.*, August 28, 1928; south of Bretz, *Bartholomew*, August 14, 1942; Reedsville, *Zuccherro*, August 21, 1931. RANDOLPH: Fords, *Millsbaugh* 426, July 9, 1890; Carr Top, Cheat Mt., *Hutton*, August 27, 1938. TUCKER:



5 mi. e. of Davis, *Allard* 10853, July 2, 1943. UPSHUR: Sago, *Edward C. & Edward R. Grose*, July 20, 1946. WEBSTER: near Camp Caesar, *Fox*, August 10, 1940.

3. *H. PERFORATUM* L. Spotted St. Johnswort. An herbaceous species with petals bearing small black dots along the edges. It is quite common throughout the State. Blooms during the summer months. CALHOUN: Pink, *Harris*, June 10, 1933; Freed, *Harris*, July 3, 1933. GRANT: 3 mi. n. Mt. Storm, *Core* 6034, July 15, 1937. HAMPSHIRE: Hanging Rock, *Frye*, June 24, 1932. HARRISON: near Clarksburg, *Judy*, Summer 1934; Shinnston, *Martin* 209, July 29, 1933. JEFFERSON: Shenandoah Junction, *Millsbaugh* 866, June 25, 1891. LEWIS: Jackson's Mill, *Margolin* 159, August 11, 1938. MARION: Rivesville, *Fling*, June 24, 1917; Booth Creek, *Rush*, June 27, 1930. MINERAL: Allegheny Mt., *Taylor* 205, August 12, 1933. MONONGALIA: Morgantown, *Millsbaugh* 233, June 24, 1890; Morgantown, *Spangler*, June 15, 1912; Morgantown, *Green*, July 5, 1928; Halleck, *Anderson & Smith*, June 27, 1933. NICHOLAS: no location given, *Burton*. OHIO: 6 mi. up Middle Wheeling Creek, *Bartholomew* 01937-353, August 4, 1934. POCAHONTAS: Droop Mt. State Park, *Wilson*, July 15, 1942. PRESTON: Lake Tetra Alta, *W. V. U. Bot. Exped.*, August 29, 1928. RALEIGH: on Route 21, *Tosh*, August 29, 1940. RANDOLPH: 2 mi. n. of Harman, *Core* 6230, June 16, 1937; Tygart Valley River valley, *Millsbaugh* 455, July 11, 1890; Pickens, *Perine*, Spring 1938. SUMMERS: near Hinton, *Boone* 205, June 18, 1933; Barger's Spring, *Fox*, July 1, 1938. WEBSTER: Point Mt., *Mr. & Mrs. Davis* 1946, August 18, 1937. WETZEL: near Knob Fork, *Haught* 452, June 18, 1931.

4. *H. PUNCTATUM* Lam. (*H. maculatum* Walt.). Spotted St. Johnswort. Yellow petals bearing several rows of black dots or lines. Quite common in damp spots in fields and along roadsides. Blooms throughout the summer. BARBOUR: Philippi, *Bush*, 1938; 2 mi. s. of Philippi, *Core*, July 14, 1937. BERKELEY: on Back Creek at Route 9, *Core* 5838, July 10, 1937. BRAXTON: Little Birch, *Harris*, August 4, 1933. CABELL: near Roland Park, *Gilbert* 782, August 21, 1939; Huntington, *Gilbert* 124, July 8, 1928. CALHOUN: Pink, *Harris*, August, 1933 and June 24, 1933; Milo, *Harris*, July 3, 1934; Arnoldsburg, *Core* 4161, June 30, 1932; Grantsville, *Harris*, July 7, 1933. DODDRIDGE: 1 mi. s. of Sedalia, *Core* 5503, July 8, 1937. FAYETTE: no location given, *Nuttall*, August 17, 1892. GRANT: 3 mi. w. of Mt. Storm, *Core*, July 15, 1937. HAMPSHIRE: Hanging Rock, *Frye*, August 1, 1932. HARRISON: Lumberport, *Sharps*, July 10, 1939. KANAWHA: Mink Shoals, *Greenlee*, August 17, 1934. MARION: 2 mi. w. of Fairview, *Core*, 5206, July 5, 1937. MINERAL: Patterson Creek flood plain, *Taylor* 98, August 3, 1933. MONONGALIA:

Greer, *Anderson & Smith*, July 6, 1933; Morgantown, *Spangler*, July 24, 1924, June 21, 1912; Morgantown, *Richard*, July 7, 1917; Morgantown, *Cox*, July 30, 1915; Morgantown, *Zuccherro*, August, 1931; Mt. Chateau, *Fling*, July 14, 1917. MORGAN: 2 mi. n. of Largent, *Core* 5722, July 9, 1937. PENDLETON: 2 mi. w. of Onego, *Core* 6191, July 16, 1937. PUTNAME: Route 35, Nitro, *Core* 6416, July 1937. RANDOLPH: Cricard, *Millspaugh* 478, July 11, 1890; 2 mi. n. Harman, *Core* 6227, July 16, 1937; Cheatbridge, *Core*, July 20, 1935; Dolly Sods Mt., *Mr. & Mrs. Davis* 654, July 11, 1937. RALEIGH: on Glade Creek, *Tosh* 614, August 25, 1940. RITCHIE: 7 mi. n. of Pennsboro, *Core* 5688, July 8, 1937. SUMMERS: Brooks, *Boone* 166, June 15, 1933. TAYLOR: 2 mi. n. of Grafton, *Core* 5487, July 7, 1937. WAYNE: Buffalo Creek, *Plymale* 49, July 24, 1937. WETZEL: n. of Littleton, *Haught* 595, July 4, 1931. WIRT:  $\frac{1}{2}$  mile above mouth of Reedy Creek, *Bartholomew*, June 22, 1934; near Owensport, *Bartholomew*, June 10, 1932, August 28, 1932. WOOD: Kanawha Station, *Millspaugh* 252, June 30, 1890.

5. *H. ELLIPTICUM* Hook. Elliptic-Leaved or Pale St. Johnswort. Slender creeping stoloniferous base, leaves elliptic. Grows in swamps and along streams in the mountainous parts of West Virginia. Blooms from June to September. FAYETTE: Cotton Hill, *Core*, July 6, 1929. GRANT: Mt. Storm, *Burton*, July 14, 1937. HAMPSHIRE: Hanging Rock, *Frye* 1391, September 25, 1932. MONONGALIA: Cheat River, *Mr. & Mrs. Davis* 5255, September 4, 1942. POCAHONTAS: Marlinton, *Strausbaugh*, June 27, 1936. PRESTON: Bretz, *Fling*, July 21, 1917, Terra Alta, *Millspaugh* 894, July 6, 1891. RANDOLPH: Cheatbridge, *Core*, July 20, 1935; Cheatbridge, *Mr. & Mrs. Davis* 3088, July 12, 1939. TAYLOR: 8 mi. n. of Grafton, *Core* 5421, July 7, 1937. TUCKER: Canaan Valley, *Mr. & Mrs. Davis* 655, July 11, 1937; along Blackwater, *Mr. & Mrs. Davis* 5255, September 4, 1942; along Blackwater, *Slayton*, July 18, 1940; Red Creek Plains, *Core* 6805, July 5, 1938.

6. *H. VIRGATUM* Lam. Virgate or Coppercolored St. Johnswort. Petals copper color, sepals herbaceous, erect. Grows along streams. Has only been collected in two counties of the State. Blooms from June to September. FAYETTE: Cotton Hill, *Sharp*, June 26, 1941; Cotton Hill Station, *Core* 4224, July 7, 1932; rocky river bank, *Nuttall*, August 5, 1892. SUMMERS: Brooks, *Boone* 557, August 21, 1933.

7. *H. MUTILUM* L. Dwarf, Small-Flowered or Slender St. Johnswort. Flowers small, about 4 mm. broad. Quite common throughout the State. Blooms through the summer from July to September. BARBOUR: 1 mi. s. of Kasson, *Core* 5905, July 14, 1937. CABELL: near Huntington, *Gilbert* 912, September 21, 1940. CALHOUN: Hur, *Harris*, July 3, 1933; Pink, *Harris*, July 24, 1933. CLAY: 1 mi. n. of Clay, *Core*

6327, July 19, 1937. FAYETTE: damp roadside, *Nuttall*, July 31, 1892. GRANT: near Mt. Storm, *Core*, *McNeill*, *Strausbaugh*, July 29, 1946. HAMPSHIRE: Yellow Springs, *Frye*, September 17, 1933. HARDY: 5 mi. s. of Moorefield, *Wilson* 104, July 4, 1941, July 16, 1943. HARRISON: Duck Creek, *Martin* 321, August 1933. KANAWHA: near Dunbar Fair Grounds, *Greenlee*, August 26, 1934. MASON: McCullough Pond, *Gilbert* 1005, October 11, 1941. MINERAL: Patterson Creek flood plain, *Taylor* 78, August 3, 1933; Wild Meadow Run, *W. V. U. Bot. Exped.*, August 22, 1928. MONONGALIA: Morgantown, *Zuccherro*, August 1931. OHIO: along Middle Wheeling Creek, *Bartholomew*, July 22, 1934. POCAHONTAS: Cass, *W. V. U. Bot. Exped.*, July 22, 1927; Mullinnox Run, *Gilpin* 3, July 15, 1947. PRESTON: near Laurel Run Church, *Myers* 563, August 10, 1942; Cranesville, *Bartholomew*, *Camisa*, *Lunk*, *Miller & Smith*, August 21, 1946. PUTNAM: Buffalo, *Millsbaugh* 1089, August 10, 1891. RALEIGH: on Glade Creek, *Tosh* 562, September 8, 1940. RANDOLPH: Laurel Fork, *Gilpin* 86, July 30, 1947; Meadows, Tygarts Valley River valley, *Millsbaugh* 475, July 11, 1890; Rich Mountain, *Millsbaugh* 431, July 9, 1890; Huttonsville, *Hutton*, August 26, 1938; 3 mi. e. of Harman, *Core* 6215, July 16, 1937. SUMMERS: near Barger's Springs, *Fox*, July 10, 1938. TUCKER: Canaan Valley, *Strausbaugh & Core*, July 25, 1947; just e. of Burley's Camp, *Allard* 9048, July 8, 1941; Yokum Run, *Gilpin* 64, July 25, 1947. UPSHUR: Alexander, *Core*, August 29, 1938. WAYNE: Missouri Branch, McComas School, *Wilson*, August 2, 1940. WEBSTER: Camp Caesar near Cowen, *Williams* 491, July 18, 1936; road between Glades, *Millsbaugh*, July 16, 1890. WETZEL: 1 mi. e. of Littleton, *Haught* 675, June 28, 1931. WIRT: 1/2 mi. above mouth of Reedy Creek, *Bartholomew* 1937-489, August 8, 1937.

8. *H. CANADENSE* L. Canadian St. Johnswort. The leaves, lanceolate to linear, are merely sessile which distinguishes this from the preceding species. The specimens in this herbarium were collected in glades and wet spots in the mountainous part of the State. Blooms from July to September. FAYETTE: no location given, *Nuttall*, 1890-1898. GREENBRIER: near Lewisburg, *W. V. U. Biol. Exped.*, July 29, 1931. MONONGALIA: Tibbs Run Reservoir, *Bartholomew* Mo54, 56, 60, August 13, 1946; Greer, *Fling*, August 4, 1917; Gum Springs, *Mr. & Mrs. Davis* 1333, September 29, 1937. POCAHONTAS: Droop Mt. Glade, *Core*, July 28, 1932. PRESTON: Amboy, *Core & Davis*, September 20, 1938. RALEIGH: Oxley, *W. V. U. Bot. Exped.*, August 9, 1927. WEBSTER: road between Glades, *Millsbaugh* 571, July 16, 1890.

9. *H. DRUMMONDI* (Grev. & Hook.) T. & G. Drummond's St. Johnswort. This species has strongly-ascending linear-subulate leaves.

It grows in dry soil and has been found in only one county in West Virginia. KANAWHA: Watts Hill, *Greenlee*, August 4, 1934; near St. Albans, *W. V. U. Bot. Exped.*, August 17, 1926.

10. *H. GENTIANOIDES* (L.) BSP. (*Sarothra gentianoides* L.). Orange Grass or Pineweed. Has much reduced scale-like leaves which along with the seed pods turn red as fall approaches. It is quite branched resembling a small pine, thus the common name. Found scattered throughout the State. August-September. GRANT: Cabins, *Mr. & Mrs. Davis* 3134, August 23, 1939. HAMPSHIRE: Hanging Rock, *Frye* 91, August 1, 1932; Springfield, *Frye* 3133, July 27, 1939. KANAWHA: Cemetary Hill, *Yates*, Summer 1940. LEWIS: Jackson's Mill, *Margolin* 165, August 11, 1938. MONONGALIA: Greer, *Bartholomew* Mo62, October 15, 1946; Westover, *Bartholomew & Shoulders* Mo2, October 13, 1945; Richards, *Shunk*, August 13, 1912; Cheat River, *Strausbaugh*, August 10, 1924; Greer, *Mr. & Mrs. Davis* 1128, August 8, 1937; Morgantown, *Millsbaugh* 697, August 11, 1890; Morgantown, *Bowling*, September 13, 1943; Marilla, *Cox*, August 5, 1915. MONROE: Peters-town, *Spangler*, September 10, 1923. POCAHONTAS: Huntersville, *Mr. & Mrs. Davis*, August 18, 1937. PRESTON: Cranesville, *Bartholomew, Camisa, Lunk, Miller, Smith*, August 21, 1946. PUTNAM: Little Scary Creek, *W. V. U. Bot. Exped.*, August 13, 1926. RALEIGH: along Route 21, *Tosh* 444, September 8, 1940. SUMMERS: Brooks, *Boone* 458, August 11, 1933. WOOD: Kanawha Station, *Millsbaugh* 282, July 1, 1890.

11. *H. VIRGINICUM* L. Marsh St. Johnswort. A large herbaceous plant 3-4½ dm. high with pink flowers (sometimes purplish) 12-15 mm. broad. The black-dotted leaves are sessile or clasping, ovate or oblong, 2.5-7.5 dm. long, obtuse, glaucous beneath. Found in swamps in many parts of the State. Blooms from July-September. CABELL: Robert's Hill, Milton, *Williams* 652, October 2, 1937. HAMPSHIRE: Hanging Rock, *Frye* 1359, August 20, 1932. MINERAL: Pine Swamp, *Brooks*, July 19, 1936. HARDY: top of South Branch Mt., *Core*, August 2, 1947. PRESTON: south of Bretz, *Bartholomew*, August 14, 1942. RANDOLPH: Point Mt., *Millsbaugh* 511, July 12, 1890.

Var. *FRASERI* (Spach) Fernald with obtuse sepals has also been found in the State. MONONGALIA: Richards, *Mr. & Mrs. Davis* 5257, August 25, 1942. POCAHONTAS: Cranberry Glades, *W. V. U. Bot. Exped.*, July 24, 1928; Greenbank, *W. V. U. Bot. Exped.*, July 30, 1928. PRESTON: Reedsville, *Mr. & Mrs. Davis* 5256, August 11, 1942.

12. *H. PETIOLATUM* Walt. Larger Marsh St. Johnswort. Taller than the preceding and much branched; leaves narrowed to distinct petioles; flowers pink or greenish purple. Has been found only in a swamp in Wayne County. The West Virginia plant belongs to var.

TUBULOSUM (Walt.) Fernald (Castanea 5:82. 1940). WAYNE: 1 mi. s. of Wayne, *Plymale* 693, September 17, 1938.

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WEST VIRGINIA UNIVERSITY  
MORGANTOWN



## Branched Spikes of *Plantago Rugelii* Decaisne

P. D. STRAUSBAUGH

My observations lead me to infer that the common dooryard plantain, *Plantago rugelii* Decaisne, normally produces simple, unbranched, fruiting spikes. In fact, until quite recently, I do not recall having ever seen a plant with a branched spike.

On July 29, 1949, in a vacant lot at the corner of Hough Street and Beechurst Avenue, in Morgantown, West Virginia, I found three plants of this species, each one of which bore one or more branched spikes. There were hundreds of these plants growing here but a careful examination revealed no others with branched spikes. On July 30, 1949, in a vacant lot in the village of Bethany, West Virginia, among a large population of this species, I found six plants with branched spikes.

In each case observed the branching took place only somewhere near the tip of the spike. In some instances there was but one branch, whereas on other spikes there were six or more branches, so that the spike was terminated by a little brush. The largest and best developed branches were generally bifurcated near the base.

When I observed this unusual feature for the first time, my assumption was that these developing spikes had been broken or otherwise injured, and that the branching was a deformity initiated by such injury. However, when I examined these spikes closely, I could detect no evidence of injuries of any kind. Then the thought arose that these might be diseased plants, a possibility that awaits further investigation. That no such pathological problem may be involved is suggested by the observation that the branched spikes have been found only on the very largest plants having a most robust and healthy appearance. The branched spikes of the Bethany plants, in some instances, were quite considerably flattened indicating the possibility of a fasciation of some sort but no such flattening was observed in the branched spikes of the Morgantown plants.

One of the Morgantown plants has been preserved in the herbarium of West Virginia University, and ripe seeds will be collected for subsequent germination to ascertain, if possible, more information concerning this development. Such branched spikes may occur far more frequently than the observations of the writer would indicate, and if this be true, it is hoped that the publication of this note may induce more keen observers to report their findings with respect to this characteristic of the common dooryard plantain.

ORLANDO, FLORIDA



## NOTES and NEWS

WILBUR H. DUNCAN, *Editor*

*Note on a West Virginia Sphagnum Bog:* Dr. R. M. Harper calls our attention to the fact that Pine Swamp, near Cranesville, described by Rigg and Strausbaugh in their paper on Sphagnum bogs in West Virginia, in the December Castanea, had been described nearly forty years before by Dr. Forrest Shreve, in his Plant Life of Maryland. (Fd. Weather Service. Vol. 3, 1910. Reviewed in Torreya, (11:26-42. Feb. 1911.) But Shreve's description, on page 290 (which includes a few other swamps and bogs near by) mentions Sphagnum only incidentally; and no bryophytes are included in his systematic catalogue.

Rigg and Strausbaugh, on page 131 of their paper, have a topographic map of the Cranesville glade or Pine Swamp, and surrounding country, taken from the Accident Quadrangle (named for a small settlement in Garrett County, Maryland) of the U. S. Geologic Survey. They did not include the scale, but it is about an inch to the mile, like the original map. It shows the state line running straight south through the eastern edge of the swamp, and then making a jog of a fraction of a mile to the west, and continuing southward.

At this point it might be conjectured that Dr. Shreve did not know the exact location of the state line when he was working there, and thought Pine Swamp was in Maryland. But he was not really at fault. The 1900 edition of the Accident Quadrangle map, which he may be presumed to have used, shows the state line perfectly straight north and south, and most of the swamp east of it.

From Bulletin 817 of the U. S. Geological Survey, dealing with state boundaries, etc., by E. M. Douglas (a revision of some previous ones on the same subject), published in 1930, we learn (p. 131) that the western boundary of Maryland, the "Deakins line," was supposed to run due north from the "Fairfax Stone" near the head of the North Branch of the Potomac River, to the southern boundary of Pennsylvania, a distance of nearly 36 miles. But it was not surveyed accurately at first, and its exact location was in dispute until 1910. According to the bulletin just named, as finally located, it followed the boundaries of old land grants, and had five offsets, running nearly east and west and varying in length from 54 to 971 feet. Apparently the longest and shortest of these are shown on Rigg and Strausbaugh's

map; and the longer one is responsible for putting most of Pine Swamp in West Virginia.

*West Virginia Field Meeting:* A summer field meeting of the Southern Appalachian Botanical Club in cooperation with the Ecological Society of America and the Botanical Society of America, will be held in West Virginia September 3 to 9, 1950. Trips will be conducted in the various physiographic regions of West Virginia (and adjacent parts of Pennsylvania, Maryland and Virginia) with visits to some of the more interesting plant communities in each of these areas. A series of illustrated lectures is to serve as background to the trips. The exact itinerary has not been completed, but will be available upon request from the local chairman after August 1. The tentative program is as follows:

**Sunday September 3.** Meet during the afternoon in the newly-completed Biology Building at West Virginia University, Morgantown, W. Va. Visitors will have an opportunity to inspect the new \$2,000,000 building, which will be opened for the first time for class use on September 21. The new University Arboretum, one mile away, will also be open to visitors. In the evening a sound koda-chrome movie, "Wild Flowers of the Alleghenies", will be shown by its producer, H. P. Sturm, of Clarksburg, W. Va.

**Monday, September 4.** Visit to mountain glades in Somerset County, Pa., Garrett County, Md., and Preston County, W. Va. Dinner in Oakland, Md., followed by an illustrated lecture by Dr. Joseph E. Harned, of Oakland, author of the popular book, "Wild Flowers of the Alleghenies". Return to Morgantown.

The remainder of the week will be spent in traveling southwards along the Alleghenies, visiting various points of interest, such as recently reclaimed mine spoil banks (and ore strippings a century old), shale barrens, exposed mountain summits (as Spruce Knob, elev. 4860 feet, the highest point in West Virginia), spruce forests, cranberry glades, etc.

Members are expected to furnish their own transportation. However, the committee in charge will be glad to assist persons who come without cars to get in touch with those who have extra space. Those who can supply extra space or who need transportation are invited to notify the chairman.

Members wishing to receive further information about the meeting or who would like to have a copy of the detailed itinerary when it is available, should communicate with the chairman of the committee. All persons who plan to attend the meeting are urged to

notify the committee by August 26 so that reservations can be made for meals and sleeping accommodations.

All correspondence should be addressed to Earl L. Core, Department of Biology, West Virginia University, Morgantown, W. Va.

*Castanea Will Be Microfilmed.* The Southern Appalachian Botanical Club has entered into an agreement with University Microfilms, Ann Arbor, Mich., to make available to libraries issues of *Castanea* in microfilm form. One of the most pressing problems facing all types of libraries today is that of providing adequate space for a constant flood of publications. Periodicals pose an especially difficult problem because of their bulk and number.

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#### HOW NOT TO KNOW THE WILDFLOWERS\*

Among the booklets on the newsstands which someone has dubbed "purple pulp in bearskin covers" a Wild Flower Guide has appeared. At first this seemed rather insulting, but after looking inside and finding how hastily it had been slung together, one can not but feel that it deserves this fate.

The work comprises 144 pages with a drawing or two on most of them, accompanied by discussions of members of the corresponding family or genus. Some of the drawings are good, some crude, and too many inaccurate in one or another respect. Thus May-Apple (p. 51) is shown as having 5 petals and a minute pistil, whereas actually it

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\*How to Know the Wild Flowers. Alfred Stefferud, illustrations by Sidney H. Horn. New York: The New American Library. 1950. Field Edition, 35¢.

has 6 or more and a large pistil. Greek Valerian (p. 95) is wrongly shown to have separate petals. Ghost-pipe (p. 111) is drawn with 4 similar corolla-lobes whereas actually it has 5 lobes in a 2-lipped corolla. Some are so indefinite that the genus or species can not be guessed, as those on pages 67, 101 (r) and 104. Some plants with opposite leaves are shown as having them alternate (pp. 102, 113) or the reverse (pp. 116, 122.)

Exasperating is the assignment in the text of the wrong names to even good illustrations; thus on p. 34 a drawing of Bellwort is mistakenly called Fairybells; on p. 46 Round-lobed Hepatica is designated as Sharp-lobed; on p. 86 Creeping Wintergreen (*Gaultheria*) is mistaken for American Wintergreen (*Pyrola*); and on p. 105 Blue Toadflax (*Linaria*) is confused with Star Toadflax (*Comandra*).

Then there are botanical errors or misunderstandings. On p. 39 *Spiranthes* is said to mean twisted stalks, instead of flowers. On p. 66 "Poke Berry is one of a small family of 5 species," actually one of a large family of over 100 species (cf. Small, Manual). On p. 85 "Northern Dwarf Cornel . . . has purple flowers," actually yellow flowers and purplish bracts. On p. 92 there are "thirty-some kinds of Buckbeans (shown at the left)" whereas only two kinds are known and but one shown. And, in the Chicory Family, p. 117, the 5 stamens are neither "united into a tube at the bottom" nor to "straps at the top."

Color descriptions fare no better. None of our Primroses has, as stated on p. 89, "blue" flowers. Butterflyweed (p. 93) is not "orange-yellow with greenish corollas" but green with orange-yellow corollas; and it would be hard to visualize what Common Milkweed looks like from the characteristics on the same page, "pink to green-brown-yellow." Penstemons (p. 107) do not all have white stamens, and Large-flowered Beard Tongue is not "creamy or pinkish" but lovely lilac.

A climax in this direction is reached in a color chart on the back cover of the copy seen. Here a series of color blocks are accompanied by some flower names, but the correspondence is poor. Alongside the orange block are, among others, the names Spiderwort (actually violet-blue) Largeleaf Trillium (white) and Spring Beauty (pink). Brown is assigned to Moccasin Flower (rose-pink), Squirrel Corn (pale pink), and *Pyrola* (white). The brightest red hue is alleged to pertain to purple Fringe Orchis (mauve), Swamp Valerian (greenish white) and Shooting Star (pale pink). Indeed about the only list approaching complete color match is that adjoining the last block (which is white).

Ecology comes in for its share of mistreatment. Silver Cinquefoil, a local salt-marsh plant, is alleged, on p. 70, to grow "in dry ground everywhere." Blue Curls, which seeks the sun, gets, on p. 103, into shady places. And Mistletoe which in the northeast is dominantly on Sour Gum (*Nyssa*) and rarely on Red Maple, on p. 112, spreads on to Hickory and Oak. As to Plant Geography, Carolina Anemone does not, as stated on p. 44, range over the eastern  $\frac{3}{4}$  of the country (nor does it have big purple flowers, for that matter). Sharplobe Hepatica (p. 46) is not "more abundant in the East;" while Bunchberry (p. 85) extends west beyond Minnesota to the Pacific Coast.

There are curious condensations of sentences which are likely to mislead the beginner. Thus the statement, on p. 35, that "The bases of the sepals are bronzy-yellow, three or four inches across" has to be expanded by inserting the words "the flowers" to make sense. Again, on p. 91, "If you are lucky enough to find a bright blue flower about eighteen inches high" one would not have a Gentian, he would have a botanical phenomenon.

Errors in English or slips in proof-reading are too numerous. On p. 23, we learn that there are separate flowers, and, on p. 29, that yellow flowers are yellow. On p. 52, a many-seeded fruit becomes many-sided. Singular nouns get attached to plural verbs and the reverse: on p. 97, Miami-mist have finely fringed flowers, and p 98, Heliotrope are showy. Technical epithets are at times in roman type (and colloquial words in italics); some are misspelled, as *Hermericallis*, p. 28 and *Phlox sublata*, p. 96.

This book must regrettably be classed as the most carelessly prepared one in its field since the famous "Linnaeus-leaved Aster" work ("Pioneering with Wild Flowers.")

EDGAR T. WHERRY





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